THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal ESTABLISHED 1835 · RAILWAY RECORD. · RAILWAYS ILLUSTRATED · THE RAILWAY OFFICIAL GAZETTE

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.

Telephone : WHitehall 9233 (12 lines). Telegrams : "Trazette Parl, London"

BRANCH OFFICES

GLASGOW: 87, Union Street . . . . . *Central 4646*
NEWCASTLE-ON-TYNE: 21, Mosley Street . . *Newcastle-on-Tyne 22239*
MANCHESTER: Century House, St. Peter's Square . . . *Central 3101*
BIRMINGHAM: 90, Hagley Road, Edgbaston . . . . *Edgbaston 2466*
LEEDS: 70, Albion Street . . . . . *Leeds 27174*
BRISTOL: 8, Upper Berkeley Place, Clifton . . . . *Bristol 21930*

Annually £4 10s. by post. Sing'e copies, Two shillings.
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor : B. W. C. Cooke, Assoc. Inst. T.

Vol. 100] FRIDAY, MAY 7, 1954 [No. 19

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B.T.C. Offer for Pullman Shares

THE Chairman of the Pullman Car Co. Ltd., Mr. Stanley Adams, announced earlier this week that an offer had been received from the British Transport Commission to purchase the whole of the 900,000 issued "A" ordinary shares of 5s. each at the price of 10s. 6d. a share, and the whole of the 600,000 "B" ordinary shares of 2s. each at 8s. 6d. a share. The company's contract with the British Transport Commission expired in 1962 and there was no chance, he explained, of an extension. As there was no prospect of any major increase in revenue to offset rising costs—the present cost of building a new Pullman car is some £17,000-£20,000—this seemed to be the best possible settlement. The directors, it is understood, who have control of 105,990 "A" and 363,452 "B" shares, are recommending shareholders to accept the offer. As, in the case of winding up, the "A" shares would be redeemable at 4s. 2d. a share and the "B" at 2s. and any equity, the offer in the circumstances is not unfavourable. It is intended, if the offer is accepted, to continue to operate services over British Railways as at present, with no break in the traditions of service that have been built up over the 80 years since Pullman services began over the Midland Railway. The nationalisation of the railways in 1947 made very little difference in the operation of Pullman services over the various Regions of British Railways as successors to the railway companies with which the Pullman Car Company was collaborating, and if the Commission's offer is accepted, those services which have become an accepted institution in British railway travel will continue doubtless with improvements and extensions as they are found to be desirable.

Railway Wage Negotiations

A MAJOR difficulty in the revision of the railway wages structure now being considered jointly by the British Transport Commission and the three railway unions is determination of the minimum for the lowest paid grades. The National Union of Railwaymen is stated to be insisting on a minimum which is 10s. 6d. a week more than the present minimum of £6 4s. 6d. a week, whilst the Associated Society of Locomotive Engineers & Firemen and the Transport Salaried Staffs' Association, in view of the higher proportion in their membership of grades in receipt of differentials, are pressing for increases in differentials. These matters are reported to have been considered at a further meeting earlier this week between the Commission and the three unions, which was adjourned. The Commission's proposals for revision of the wages structure have been under consideration by the unions for some weeks. The Commission is not in a position to grant further wage increases without raising charges; after the recent rise in freight rates, and with increases in passenger fares in the London area already under consideration, any further increase should be out of the question. The matter now seems to be one of the unions facing realities and making a real attempt to agree between themselves, and adopting a less sectional attitude.

Nationalisation of Transport in the U.S.A.

THE possibility that nationalisation of the transport industry in the U.S.A. will be considered as a possible solution if its position deteriorates, was mentioned earlier this week by Colonel S. H. Bingham, General Manager of the New York City Transit Authority; the occasion was an address to students of Duquesne University. He is opposed to the nationalisation of any industry. If private operation of the railways in the U.S.A. is to be assured, however, all transport must be enabled to compete on a self-sustaining basis, and the railways must effect economies in operation and corporate organisation by integration of operations and similar devices. They must "do more to provide that efficient economical, adequate, and integrated service that the British nationalisation Act (of 1947) requires"; one way he suggests is standardisation of rolling stock as practised on British Railways, and co-ordination of rolling stock building resources. A national transport policy should be developed by a Federal Department of Transportation corresponding to the British Ministry of Transport, with regulation of all forms of transport by a body within the Department or responsible to Congress. As a last resort, to stave off the worst evils of Government ownership, he advocates a form of quasi-public transport corporation in which privately-owned undertakings would be acquired without cash outlay by the Governmental body concerned in return for revenue bonds issued for a specific term.

Road Haulage Survey

A SAMPLE survey of road goods transport carried out by the Ministry of Transport in September, 1952, covered over 7,000 vehicles, and included those under each type of carrier's licence besides vehicles operated by the Road Haulage and Railway Executives. Calculations were made of the ton-mileage and total tonnage of goods carried. Over one-quarter of the medium weight "B" licence vehicles, it was found, were carrying coal and coke. Iron, steel, and machinery were of considerable importance in the goods carried by the heavier "A" and "C"

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licence and British Road Services vehicles. In the week covered by the inquiry road goods vehicles in this country carried 17,000,000-18,000,000 tons—against 5,500,000 moved by rail, of which latter over 3,000,000 tons were coal class traffic. In terms of net ton mileage, however, road and rail each accounted for about the same amount of traffic. Nearly 10 per cent of the tonnage and 22 per cent of the ton mileage were in vehicles of the British Transport Commission; the average length of haul of goods by road was probably about 20 miles; but nearly 2,000,000 tons was carried on hauls of more than 40 miles, about half of it in "C" licence vehicles. Three-fifths of the vehicles were shown to have been manufactured since the end of the war—striking evidence of the question of road transport.

Materials Handling Convention

THE success of the first national convention organised by the Institute of Materials Handling and held at the Central Ordnance Depot, Didcot, last week augurs well for the future conventions and demonstrations of equipment which the Institute hopes to arrange. A brief account is given on another page. The choice of an army depot where such equipment already is in use is particularly appropriate, and especially so in view of the War Office plans for extending mechanical handling. The subject is of great interest to railways both in the handling of their own stores and in the transport of merchandise. Much has been done by railways in this country in the introduction of mechanical handling equipment to save time and manpower, and in demonstrating to railway users the possibilities of better freight transits inherent in palletisation. There are, however, various obstacles to palletisation of freight dispatched by rail, one of them being the necessity for some standardisation of package sizes, though even this in time may be overcome.

Converting a London Transport Substation

ROTARY converters supplying the Central Line of London Transport have already been subject to one change of frequency, when power was taken at 33⅓ cycles from Lots Road instead of from the original 25-cycle generating station at Wood Lane. With the need for increased capacity, and the projected changeover to a 50-cycle input it became necessary to undertake re-equipment of some of the older substations with modern static apparatus suitable for remote supervisory control. Bond Street substation is one of the first to be dealt with in this way, and the changeover, carried out by the Hackbridge & Hewittic Electric Co. Ltd., is described on another page. Special design was necessary to provide the required output in the limited space available. Rectifiers and transformers have therefore been combined as single units, with individual parts in sections capable of being manœuvred into position by two or three men. Oil cooling has been dispensed with, and the closed air-circuit transformers represent the latest development of a Hackbridge & Hewittic design first installed for London Transport in 1948. When the supply frequency is raised to 50 cycles the only modifications necessary to the rectifiers will be replacement of the fan motors and adjustment of the exciter and anode chokes. Like the Southern Region change-of-frequency scheme described in our March 19 and April 16 issues, the changeover has been effected without interrupting traffic.

"Restoration or Restitution"

FINANCIAL aid—a subsidy in fact—for British Railways in the form of "restoration or restitution" by the Government is advocated by Mr. J. S. Campbell, General Secretary of the National Union of Railwaymen, in a recent issue of his union journal *The Railway Review*. The time has come, he states, when something must be done to enable the railways to meet rising costs and improve their equipment; and railwaymen must not be expected through their low wages to carry the burden of subsidising industry generally. He deprecates further increases in railway charges because of the resultant "vociferous complaints," but he is very doubtful that such increases could price the railways out of the transport market, and does not think them necessary. He rejects direct subsidy, because of its resultant evils. The third course, which he advocates, he calls restoration or restitution because, he says, the Government retained a profit of about £124,000,000, which it made on the railways during the war and up to nationalisation in 1948. The Government, he urges, in recognition of this, should underwrite the difference between railway net earnings and central charges for a period of five years, which would give the British Transport Commission a breathing space.

Rimutaka Tunnel Pierced

ON April 20 the two pilot headings met in the middle of the new Rimutaka tunnel, the largest in the British Commonwealth and in the Southern Hemisphere, and the eleventh longest in the world. It is 28,864 ft. in length and the error in alignment of the two headings when they met is reported to have been ½ in. The completion of the opening-out and of the concreting in the lining, the laying of a concrete floor, and the construction of a 350-400-ft. ventilation shaft still have to be undertaken and it is expected that the whole work will be finished about the middle of 1955. The slow and tortuous 2-hr. climb over the existing Rimutaka incline will then be replaced by a 30-min. run over the new line through the tunnel, and the estimated saving in operating and maintenance costs is £80,000 a year; the reduction in length of line will be over nine miles. Almost the whole of the tunnel work has been done by the American-New Zealand firm of Morrison, Knudsen & Downer Limited.

Abandoning the Incline

CABINET approval for preliminary work was given in October, 1946. Work was carried on slowly within the limits of labour and equipment available for some years. The Ministry of Works drove 1,200 ft. of the project and tenders for its completion were called in 1950. In August of the next year, the present contractors took over. American methods are stated to have been used, but the labour was mainly New Zealand. The work is now 14 months ahead of schedule, though much has yet to be done on the approaches on both sides of the tunnel, and a bridge must be built over the Mangaroa river. Passenger services over the new line are to be provided by railcars, whilst goods trains will be hauled by diesel-electric locomotives. The working of the Rimutaka incline with steam locomotives on the Fell system, which has made this feature widely known outside New Zealand, has long been very costly. No doubt the economies to be derived from its projected abandonment and from diesel working of the line through the new tunnel were considered to go far to justify the heavy capital expenditure on the new works.

Italian Signal Aspect Alterations

WITH the introduction of light signals in Italy all that was done at first was to display during the 24 hr. the same indications as were given by the semaphores at night, a course followed in several countries and by the former G.W.R. in this country. Eventually, however, certain difficulties, all along experienced with the older signalling, inseparable from the two-position system of aspects, were countered by adopting a yellow over green aspect as an approach warning to a yellow aspect at short braking distance, or as an indication that a diverging route was to be taken at the signal in advance. This new aspect was made steady when speed at that signal had to be not more than 18 m.p.h., and flashing when the limit was 36 m.p.h. This aspect had thus some of the functions allocated to the double yellow in Great Britain. Practice showed, however, that it was desirable to restrict its use to junction working

and accordingly it was decided to use a flashing yellow as an approach warning for single yellow at less than full braking distance, and this change is to be made as opportunity serves. The bracket type of signal is standard for junctions, but at station outlets is to be simplified as much as possible in future by using route indicators to limit the doll posts to a maximum of three. These alterations are described in *La Tecnica Professionale* by Signor G. Spunticchia.

An Unsuspected Tunnel Shaft

THE accident on April 28 1953, at the Clifton Hall tunnel, in the London Midland Region, which passes under Swinton, was exceptional. As will be seen from our summary in this issue of the report of Brigadier C. A. Langley, Inspecting Officer of Railways, the tunnel was over 100 years old and the eight shafts used during its construction, when certain difficulties were encountered, finally were filled in, and all trace of them obliterated. No location marks had been provided inside the tunnel. Most unfortunately also all plans in the District Engineer's office had been destroyed, partly by enemy action, and the maintenance staffs were unaware of the presence of the shafts, with which the remains of temporary timber frameworks were embedded and had gradually decayed. Mining work below had led to certain slow subsidence and at intervals the tunnel had been strengthened by steel ribs and a certain amount of renewal work. When the fall of brickwork occurred prompt steps were taken to order additional ribbing, but the real danger was not suspected, of course, or more urgent action would undoubtedly have followed. Some unavoidable delay took place in getting one rib into a near position, after much hard work, and before anything more could be done the ground above collapsed suddenly, bringing down two houses completely, with a loss of five lives, and seriously damaging another. This accident has brought out the great importance of accurate records being available and the need to mark plainly inside tunnels the locations of all old shafts.

Experiment with Diesel Passenger Trains

THE placing in service in the West Riding on introduction of the summer timetable next month of the multiple-unit diesel trains described on another page, will complete the first phase of a bold experiment. The dieselisation of a complete train service involves recasting the timings so as to give the intensive user which is essential for a return on the heavy capital outlay; experiments, therefore, with only one or two units would be of little help. The decision to spend £2,000,000 on the development of lightweight diesel trains to run in six separate areas of Great Britain was based largely on the findings of the committee on diesel working under the chairmanship of Mr. H. G. Bowles, of the Western Region; the committee was appointed by the Railway Executive in August, 1951. Its examination was to include main and secondary, besides branch lines. In its report early the following year it recommended the introduction of lightweight diesel trains in the West Riding and certain other areas.

The advantages of diesel as compared with steam include greater serviceability, operation by one driver without a fireman, easy ascent of gradients, rapid acceleration, quick turnround at terminals, and cleanliness. There are, on the other hand, certain drawbacks, of which lack of elasticity, because of the inability in many cases to attach additional coaches and vans, is the chief; this last, however, was overcome by the Great Western Railway before the war, and is being overcome by the Great Northern Railway Board in Ireland, as recorded in our issue of October 16, 1953. On the other hand, the possibility of coupling the new two-coach units into four-, six-, or eight-car trains affords considerable elasticity. With British Railways there was no true precedent on which to make assessment from the commercial operating or mechanical aspects of the new services. The various long-distance high-speed diesel passenger services on the Continent operate in conditions which do not exist in this country. The G.W.R. diesel cars placed in service before the war on various types of duty did not operate any one service on a scale large enough to assess the advisability of dieselising complete train services, even although they seem to have provided valuable data on which to judge diesel railcar performance. The experimental diesel passenger services on the other mainline companies were on an even smaller scale. Something in the direction of what is now being done by British Railways has been done in Ireland, though except for the Belfast-Bangor suburban line of the Ulster Transport Authority no part of Ireland hitherto seems to have afforded the density of traffic to be expected in the areas selected for dieselisation in Great Britain.

The six areas moreover differ between themselves. There is no great similarity between the half-hourly service to be provided next month between the great population centres of Leeds and Bradford, and the interurban diesel train service eventually to work between Newcastle and Middlesbrough, which serves a greater number of important intermediate points. West Cumberland, with smaller population centres rather further apart, presents another picture. The services to operate in agricultural Lincolnshire and East Anglia, with an absence of steep gradients, again must be different. These five areas nevertheless are alike enough to justify basically the same design of two-coach unit, though in some areas only one motor vehicle will be needed for each two-car unit; the two-coach sets for West Riding are powered by four 138-b.h.p. Leyland motors, two in each vehicle, which should be ample for the gradients encountered on these services. For the proposed Edinburgh-Glasgow interurban service the higher standard of comfort and amenities, such as a buffet service, expected by travellers by long-distance express, is to be provided. According to Mr. M. R. Bonavia, Chief Officer (New Works), British Transport Commission, in an article in the current issue of the *British Transport Review*, consideration is being given to a fast diesel service between Birmingham and South Wales, and the G.W.R. Birmingham-Cardiff service no doubt has been a useful precedent on which to base estimates, at least from the commercial point of view.

In all the six areas the services will be much improved in speed because of the quick acceleration and good performance up gradients, and in frequency. The diesel trains will be based on certain stations near depots equipped for their maintenance staff; other staff questions arising out of dieselisation presumably have been solved. In all the areas the lightweight units will operate partly in addition to and partly in replacement of existing steam services. Their operation is likely to succeed in lowering operating costs considerably. How far it will create new traffic is problematical. The forthcoming diesel train service between Leeds and Bradford and Harrogate is a great improvement on the existing one, but the difference between old and new timings over the relatively short distances may not compensate for the disadvantageous location of stations, force of habit in the traveller, and other factors in favour of travelling by bus or private car. From the commercial point of view, the Regions of British Railways concerned may be relied on to do all possible to ensure the success of the new services in the different areas, both by quotation of appropriate fares and by advertising.

The two-coach units themselves have much to offer the passenger. Apart from their attractive interior design they offer the amenities of the views forward and back through the unobstructed back windows, and of ample baggage space; lavatories also are provided in this short-distance service. There are doubtless travellers who would prefer the privacy afforded by ordinary compartment stock. The bus-type seating, also, which to increase accommodation by saving space, has not been made reversible, has its drawbacks, of which the lack of arms at the gangway end of the third class section is one. It might, perhaps, have been better to have increased comfort at slight expense of capacity and so provide another advantage over public road transport. These, however, are small points and doubtless public reactions to the new experimental services will be carefully watched so as to facilitate improvements as opportunity occurs.

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Western Region Summer Timetables

THE speed reputation which the Great Western Railway made for itself in the years before the war is largely re-established by the notable accelerations which figure in the summer timetables of the Western Region. Some of the start-to-stop times are faster than any which have operated previously over the lines of this Region or its predecessor.

The most outstanding development is the restoration, after 15 years, of the pre-war "Bristolian," the only difference being that the start from Paddington is at 8.45 instead of 10 a.m. Down via Bath the 118·3 miles in 105 min. entails a start-to-stop average of 67·6 m.p.h.; the return at 4.30 p.m. via Badminton, 117·6 miles, calls for an average of 67·2 m.p.h. The 9.5 a.m. from Paddington to Bristol and the return train at 4.15 p.m., which temporarily have carried the name "Bristolian," continue to run, the latter calling additionally at Chippenham and Reading (the Reading stop replaces the previous slip), and arriving 2 min. later, at 6.42 p.m. The 1.15 p.m. from Paddington to Weston-super-Mare is made a 2-hr. train to Bristol, and is booked over the 106·9 miles to Bath in the unprecedented time of 97 min. (66·1 m.p.h.); the 5.5 p.m. down is accelerated to reach Bristol in 2 hr. 10 min., with a time of 109 min. to Bath (58·9 m.p.h.); and the recently-installed 7.50 p.m. down is accelerated 10 min. to reach Bristol in 2 hr. 14 min., notwithstanding an additional stop at Chippenham. This calls for a 35 min. run from Paddington to Reading (36·0 miles, 61·7 m.p.h.), and a 58 min. run from there to Chippenham (58·0 miles, 60·0 m.p.h.), both faster than ever previously tabled. In the up direction the 9.0 a.m. from Bristol reaches Paddington at 11.8 a.m., 12 min. earlier, with a 110 min. timing from Bath (58·3 m.p.h.). The 1.50 p.m. from Bristol, restored last year, is stopped at Chippenham, but accelerated 10 min. to arrive at 4 p.m., and runs the 94·0 miles from Chippenham to Paddington in 93 min. (60·6 m.p.h.). The most creditable up acceleration, however, is that of the up "Merchant Venturer" (5.25 p.m. from Bristol), which by a cut of no less than 29 min. is booked into Paddington at 7.31 p.m., in 2 hr. 6 min. inclusive of stops at both Bath and Chippenham. The 90 min. timing from Chippenham to Paddington involves a start-to-stop speed of 62·7 m.p.h.

The only change of note on the West of England main line is an acceleration by 10 min. down and 15 min. up of the "Torbay Express," bringing the time between London and Torquay down to 3 hr. 35 min. each way (within 5 min. of the pre-war 3½ hr.). The time allowed for the 173·5 miles between Paddington and Exeter is 175 min. in both directions (58·1 m.p.h.). The 11 a.m. from Paddington to Plymouth is altered to leave at 11.30 a.m., and is passed between Taunton and Exeter by the "Torbay Express"; by changing at Exeter, passengers by the 12 noon down thus can reach Plymouth at 4.55 p.m., an acceleration of 40 min. on the previous 11 a.m. service.

The principal accelerations on the South Wales service are those of the "Pembroke Coast Express." The down train, at 10.55 a.m. from Paddington, is booked over the 133·4 miles to Newport in 141 min., and reaches Cardiff 11 min. earlier, at 1.40 p.m. The up train leaves Pembroke Dock 10 min. later, at 1.10 instead of 1 p.m., and Cardiff at the same time (5 p.m.), from which it is accelerated 20 min. to Paddington, arriving at 7.45 p.m., a total gain of 30 min. The 133·4 miles from Newport to London occupy 147 min.

On the Birmingham main line a notable restoration, for the first time since the war, is that of the "Cambrian Coast Express" as a daily service. Except on Saturdays, it leaves Paddington at 10.10 a.m. as a 2-hr. train from Birmingham, calling only at Banbury, and gives a service to Shrewsbury, reversing in that station; Aberystwyth is reached at 4.5 p.m., and this is 45 min. quicker than the best previous service. In the up direction, except Saturdays, departure from Aberystwyth is at 11.15 a.m., and arrival in Paddington at 6 p.m., with a 2-hr. run from Birmingham; this is 60 min. faster than any existing service. In this direction a stop is made at Leamington (not Banbury), and the 23·3 miles from Birmingham to Leamington are booked in 23 min. (60·8 m.p.h. start-to-stop). The 11.10 a.m. from Paddington to Birkenhead omits the Banbury stop and is accelerated 27 min. to Birmingham, becoming a 2-hr. train; the run of 87·3 miles from London to Leamington is scheduled in 87 min. (60·2 m.p.h.). The 2.10 p.m. down is accelerated 11 min. to Birmingham, and reaches there at 4.26 p.m.

On Saturdays all the usual extra trains are run over the various main lines, and where the trains concerned run on Saturdays all the foregoing times are slowed down. An interesting Saturday innovation is a train from Swansea at 10.20 a.m. to Aberystwyth via Carmarthen and the old Manchester & Milford line, with a through coach for Pwllheli via Machynlleth and Barmouth. A balancing service runs in the opposite direction, starting from the holiday camp station at Penychain, just south of Pwllheli. Another through service, in this case daily, is run between Swansea and Penzance, via the Severn Tunnel, with through coaches between Cardiff and Paignton. This leaves Penzance at 7.55 a.m., calls at almost all stations to Plymouth (dep. 11.5 a.m.), then at Newton Abbot and Exeter only to Bristol; Cardiff is reached at 3.50 and Swansea at 5.17 p.m. In the reverse direction departure from Swansea is at 11.10 a.m., Cardiff at 12.30 p.m., and Bristol at 1.45 p.m., reaching Plymouth at 5.5 p.m. and Penzance at 7.55 p.m.

On Sundays additional expresses are run from Paddington at 1.10 p.m. with restaurant car to High Wycombe, Banbury, Leamington, Birmingham, and Wolverhampton; at 6 p.m. non-stop to Birmingham and thence to Shrewsbury and Gobowen (a relief to the 6.30 p.m. down); and in the reverse direction from Birkenhead at 11.35 a.m. and Birmingham at 3.10 p.m. to Paddington (5.45 p.m.); and at 6.55 p.m. from Birmingham to Paddington via Oxford. Both the two last are refreshment car trains. Instead of the 12 noon from Penzance to Paddington, there will be two restaurant car trains, one at 11 a.m. (due 7.25 p.m.) and the other at 1.20 p.m. (due 9.30 p.m.); there is also a new Sunday service at 1.30 p.m. from Paddington to Penzance, additional to the summer Sunday service of previous years.

Transport in the Central African Federation

WHEN the Federation of Central Africa, comprising the self-governing colony of Southern Rhodesia, the Crown Colony of Northern Rhodesia, and the Protectorate of Nyasaland, was formed in August, 1953, the railways, their ancillary transport services, and airways, became a responsibility of the Federal Government. These services were reviewed in a paper entitled "Central Africa—The Transport Aspect," given recently by Mr. N. E. Norman, Assistant (General), Nyasaland Railways, to the British Railways, Southern Region, Lecture & Debating Society. Within these territories the largest transport agency is the Rhodesia Railways, a statutory body acquired in 1947 by the Southern Rhodesia Government. This system has a 3-ft. 6-in. gauge, route mileage of 2,479, of which 579 miles are operated on its behalf by the South African Railways. Although there is a physical connection between the northern end of the Rhodesia system, via the Belgian Congo and the Benguela Railway, and the Atlantic port of Lobito Bay, gradients, restrictive operating conditions and preferential tariffs in favour of the Beira route cause the tonnage to be moved by the Lobito route to be inconsiderable compared with that sent to Beira or South African ports.

Gross ton miles of the Rhodesia Railways increased 100 per cent between 1947 and 1953. As the line is single throughout steps have been taken to improve line capacity; in 1952 the first section equipped with C.T.C. was inaugurated. To provide another port of entry to Rhodesia, it was decided in 1951, in conjunction with the Portuguese Government, to construct a new link to form part of a direct route between Bulawayo and the Portuguese port of Lourenço Marques. The cost to the Rhodesian Government is estimated at £4,500,000 and it is hoped that the line will be opened in 1955. Surveys have taken place to

investigate the possibility of linking the Rhodesian and East African systems. (The conclusions reached were summarised in our October 3, 1952, issue.)

Railway transport in Nyasaland is provided by the Nyasaland Railways Limited, one of the few remaining company railways within the British Commonwealth. The first line was opened in 1908. Through communication with Beira was achieved in 1922 and was improved by the opening in 1935 of the Lower Zambesi Bridge, the longest railway bridge in the world.

The development of the port of Beira was entrusted in 1927 to Beira Works Limited, a British company bought in 1949 by the Portuguese Government; the Mozambique Railways and Harbours Administration operates the port, where tonnage handled increased from 1,300,000 tons in 1937 to 2,410,000 tons in 1952. By an agreement in 1950 the Portuguese Government is obliged to maintain the port and the railway connection to Rhodesia in a state of efficiency and capable of handling traffic to and from Rhodesia and Nyasaland. In return the United Kingdom has promised to maintain preferential rates in favour of Beira.

A new rates structure, introduced in Rhodesia in July, 1952, represents in effect a 12½ per cent increase in charges. The great increase subsequently in low-rated traffics and a slowing down of high-rated imports and general goods caused an additional interim 10 per cent increase to be imposed in October, 1953. On the Nyasaland Railways and also on the British-owned Trans-Zambesia Railway in Mozambique, with which it forms an end-on junction, rates, basically unchanged since 1935, were increased by 25 per cent in February, 1951, on some sections. Interim rating policy in Southern and Central Africa, Mr. Norman points out, will undergo a considerable change later this year as a result of the acceptance in principle by the South African Railways & Harbours of the Railway Rating Report (the Newton Report) of 1950. In Africa although the importance of the cost factor as an element in fixing rates is generally recognised, it is by no means agreed that cost alone should form the basis of railway tariffs. The Newton Committee recommended that a closer analysis of costs was necessary to ascertain the differences in the direct costs of conveying the different classes of commodities. Although some considerations might make it expedient to carry some commodities at less than direct cost, such factors should not be allowed to enter into the economics of rate making.

New Railways in Venezuela

THE railway building programme embarked on by the Government of Venezuela was prepared three years ago by the former National Transit Council and approved with some modifications, by the State Railway Administration, the body responsible for management of the national railways. Most of the eleven existing lines, with a combined length of nearly 700 miles, were built during the last century by British, German, and French interests, under onerous obligations to the Government. They are short unconnected systems intended to serve the needs of isolated areas. The diversity of gauges, even in the only connecting lines, made transhipment burdensome and unnecessarily expensive. These few railways mostly paid their way until the development of road transport. During the war of 1939-45 they enjoyed a flourishing business, but since then road competition has hit them hard. Reduction of passenger and freight rates has been to no avail. In 1946, buses carried 143,051,752 passengers and railways 1,392,062; in 1949 the corresponding figures were 189,524,421 and 612,933. Unable to meet expenses, the railways are suffering from lack of maintenance and one of them, La Ceiba Railway, stopped operations some years ago.

An influential section of public opinion believes, with the Government, that a unified and well managed railway system is the answer to the transportation problem in a country of such great distances. The 7,000 miles of main road are now unable to support the traffic they bear, and road maintenance costs are becoming a serious item.

As a preliminary to carrying out the railway building programme, the Government began to acquire the foreign owned lines, and by 1950 had purchased all but two lines, the Táchira Railway which connects with the Columbian Cúcuta Railway, and the Carenero, but the Government owns 30 per cent of the stock in the Táchira. The programme is being undertaken for the primary purpose of giving an efficient and economical railway system to a country in full development. Only a moderate return on capital investment is expected. The initial outlay may be high, but operating expenses are expected to be low. In the matter of fuel, Venezuela is in a position to secure an abundant supply of diesel oil from the oil companies developing her own deposits, and all lines presumably are to be dieselised.

The purpose of the programme is to provide trunk lines that will connect agricultural, cattle, and mining areas with consumption centres and ports, and will also traverse the regions offering the most promising potentialities for development. Railways and roads will be complementary, the former being used for long and the latter for short hauls. The new railways will be constructed parallel to the existing roads.

The plan is divided into two phases, which together provide for lines throughout the country totalling 2,640 miles. The first phase, in which some 1,500 miles of line are to be built, will take five years to complete. Construction costs are estimated at £40,000-£50,000 a mile. All lines built under the programme are to be 4 ft. 8½ in. gauge.

The first line to be surveyed, from between Puerto Cabello on the coast south-westward to Barquisimeto, will have a connection at the latter city with the double track line to run westward from Caracas to Sabana de Mendoza. For construction purposes it has been divided into three sections. This 110-mile line will have maximum gradients of 1 in 50 and curves of 14 ch. minimum radius

A Check to U.S.A. Railway Progress

THE January statement of revenues and expenses shows how severely the industrial recession in the United States is limiting the earning power of the railways. The total operating revenues of $749,825,800 were below the 1953 level by $113,188,800, or 13·1 per cent. Freight revenue was down 13·5 per cent and passenger revenue 11·6 per cent, while receipts from mail, express and other sources were less. Though working expenses were cut by $34,895,000, or 5·3 per cent, the operating ratio for the railway system as a whole rose from 76·7 per cent to 83·6. The outcome was a 59 per cent fall in net railway operating income (earnings before charges) from $80 million in January, 1953, to $32·6 million, bringing the rate of return on property investment for the 12 months ended January 31 down to 4 per cent.

The January net income (earnings after charges) was $18 million against $57 million the year before, a decrease of 68 per cent. Of 124 Class 1 railways, 14 companies operating small mileages in special conditions increased net earnings. No fewer than 36 companies failed to make ends meet; in January, 1953, only 16 companies had deficits. It was sad to see the New York Central short by $867,000 in contrast to being $3,437,100 to the good last year. N.Y.C. freight and passenger revenue both declined by 14 per cent and, though expenses were down 8 per cent, the operating ratio was 91 per cent against 85. A narrow margin saved the Pennsylvania from a similar predicament; operating at a ratio of 89 per cent, its earnings before charges shrank by 93 per cent to $402,750, about a sixth of the earnings of the Baltimore and Ohio, which held its operating ratio at 82 per cent. Working expenses were very high in the Northwestern Region, where none of the large roads earned any net receipts. The Milwaukee operated at a ratio of 94 per cent, the Great Northern at 105·5, and the Northern Pacific

at 108. The net operating income for all railways in the Central Western and South Western Regions was about half of the 1953 totals; the enterprising "Frisco" and "Cotton Belt" lines were exceptional in having large deficiencies.

Similar details for February are not yet to hand, but it is known that net operating income for the railway system was $44·4 million, a decrease of 43 per cent, while net income was $21·5 million, a decrease of 61 per cent. At present there are no signs of a recovery from the poor beginning to 1954. During the first quarter of the year wagon loadings were 1,041,900 fewer than in 1953, a decrease of nearly 12 per cent, and 1,499,500 less than in 1952, a drop of 16 per cent. Decreases in coal, coke and ore loadings were especially heavy because steel output did not exceed 75 per cent of manufacturing capacity. The tonnage of export coal shipped overseas and the volume of other export freight through U.S.A. ports also declined sharply. The Shippers Advisory Boards estimate that in the second quarter of the year wagon loadings will improve, but may still be 7 or 8 per cent below last year's figures.

Nobody ventures to prophesy an increase in passenger business, though the New York Central claims to have reduced the loss on running its services. In January the Illinois Central was the only large company to add to its passenger revenue. The Western railways, which have striven to develop long-distance travel, had a particularly lean time. Passenger takings were down 23 per cent on the Santa Fe, 22 per cent on the Milwaukee, nearly 18 per cent on the Union Pacific and 17 per cent on the Southern Pacific. Unless the lines west of the Mississippi can check these downward trends, they stand a poor chance of earning an adequate return from recent expenditures on luxurious passenger equipment.

When their revenues are shrinking, the railways have to contend with soaring prices for material and supplies. The U.S.A. index for these prices is based on an average of midsummer prices in the three years 1947 to 1949 being taken as equal to 100. In January the index rose to 124·1, an advance of 3·7 per cent on January, 1953, and an all-time high. Labour costs also grow incessantly. Though the average straight time rate of pay of railway employees stood at $1·88 an hour in 1953, more than two and a half times the 1940 rate, the railways are seldom free from extravagant demands for better conditions of service. If one programme put forward recently by 15 non-operating unions were conceded in full, the annual cost would be almost double the estimated net income of the railways for 1954. Evidently a testing time for railway management lies ahead, but, if the standard of efficiency reached in 1953 is maintained, the check to progress in 1954 may prove to be merely temporary.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Cross-Channel Fares

April 29

SIR,—Now that the holiday season is beginning, the time seems ripe for some comment on the extortionate fares charged by British Railways on some of their Continental steamer services and particularly on the Dover/Folkestone/Calais/Boulogne routes; reckoned on a mileage basis these must be easily the most expensive steamer fares in Europe.

There seems to be no good reason for this policy of high fares which is driving many people to the competing air services and discouraging week-end trips to the French and Belgian coastal resorts, a valuable source of additional revenue, one would have thought.

Yours faithfully,

E. E. SMITH

Castle View, Stagshaw Road, Corbridge, Northumberland

[There does not seem to be any evidence that these steamer fares are a deterrent to paying traffic. Having regard to the present high operating and replacement costs of vessels, to harbour dues and other port charges, and to the necessity for British Railways steamer services to continue to pay their way, we do not agree that the fares are "extortionate." —ED., *R.G.*]

Motive Power Maintenance Figures

April 29

SIR,—You often quote in your columns figures showing totals of various forms of motive power on Class 1 American Railways, with the percentage of each under repair. These latter figures are usually about 10 for steam, 5 for straight electric and 1 per cent for diesel.

It has, I know, been pointed out by previous correspondents that figures for diesel will be low because the diesel locomotives are mostly fairly new, and figures for steam locomotives high, as they are older; and the fact that there is a surplus of them must mean that a number stand idle awaiting decision as to repair or scrap.

I fail to understand why the percentage of electric locomotives available for traffic should be so much less than the figure quoted for diesel-electric, as there is much more to go wrong with the latter. Is it that the figures are arranged to show the diesel to its best advantage?

British Railways main-line diesels seem to spend an astonishing amount of time out of service for repair, though admittedly they have not the advantage of being a standard type.

It would be interesting to know the figures for percentage of steam locomotives under repair on the Norfolk & Western Railway, compared with the others.

It was stated recently that diesel engine exhaust fumes are more injurious to health than those from petrol engines or smoke.

Yours faithfully,

J. B. LATHAM

18, Wheatsheaf Close, Woking

North Lancashire Rail Tour

April 24

SIR,—With reference to the North Lancashire rail tour of the Stephenson Locomotive Society on May 1, referred to in your issue of April 23, it was stated this would be the first passenger train to arrive and depart from Lancaster Old Station since 1849. As a point of interest I would like to mention that the last passenger train left Lancaster Old Station at 11.30 p.m. on June 26, 1944, for Norwich.

Yours faithfully,

E. G. GRAHAM
District Traffic Inspector,
Lancaster Green Ayre Station

Lancaster

New Station at Twickenham

May 1

SIR,—On seeing the lower photograph of the new station at Twickenham on p. 498 of your issue of April 30, some of your readers, like myself, may have wondered how passengers are expected to locate the usual platform amenities such as waiting room and lavatories. This is station name signing gone mad.

Certainly station name signs should be as prominent by night as by day, but the two specialised matters of lighting and signing should be developed quite separately so that the optimum value may be secured from each.

Yours faithfully,

ROGER MAKINS

38, Bourne Avenue, Southgate, N.14

THE SCRAP HEAP

Buffet Bullies

Station catering did nothing to soothe the miseries endured by early railway travellers. Until the 1890s, most companies leased refreshment rooms to contractors whose sole ambition seems to have been to fleece the unfortunates who looked to them for succour. Evidence abounds of gross maltreatment . . . Dickens turned his experiences to good account. "The Boy at Mugsby" is a breezy satire on the railway catering system. "The Mugsby Refreshmenters ockipy the only proudly independent footing on the line," the unspeakable Boy informs the Traveller from Nowhere as he pours him out a "—ha, ha, ha!—a sherry—O my eye, my eye!"

The antics at Mugsby Junction (probably Rugby) can be checked against facts. A favourite trick with contractors—Swindon and Wolverton were notorious for it—was to serve coffee so hot that few could drink it within the prescribed time. . . . As for the coffee's flavour, this can best be judged by a letter written in 1842 by Isambard Kingdom Brunel, of the Great Western. Evidently it is in reply to one from S. Y. Griffiths, of the Cheltenham hotel which ran the Swindon Refreshment Rooms.

Dear Sir,—I assure you Mr. Player was wrong in supposing that I thought you purchased inferior coffee. I thought I said to him that I was surprised you should buy such bad roasted corn. I did not believe you had such a thing as coffee in the place; I am certain that I never tasted any. I have long ceased to make complaints at Swindon. I avoid taking anything there when I can help it.—Yours faithfully, I. K. BRUNEL.—*From "The Manchester Guardian."*

An Ancient Art

The British Transport Commission has a beautifully arranged exhibition in the noble shareholders' meeting-room at Euston. "Popular Carriage," it is called. . . . It succeeds two other excellent shows, "Royal Journey" and "London on Wheels," and contrives to be the most interesting of the three.

The game of derivations can be played with as much enjoyment in the art of coach design as in any of the other arts. The catalogue begins the story with the Romans, whose carriages had fixed axles, so that the straight Roman roads were almost a necessity. Then, the one replacing the other, we hear of the whirlicotes wagon, the Berlin, the brougham, the diligence, the waggonette. How many of these can we define accurately? From one or other of them every bus or coach in use on roads or railways today is directly descended.

The lesson of this exhibition is that of the oft-heard statement "people will put up with anything nowadays." This is meaningless when applied to the sufferings of travellers, by comparison with what they used to endure without a murmur.—*From the "Irish Times."*

Train Crew Haircut

Most little boys dislike the barber's high chair and the cold, creepy feel of clippers and scissors. Robert is no exception, but his mother has found a way, so that his hair is tidied up without tears. His passion is trains, and so, on the maturing date of the haircut, he is taken to the station to see the local goods train shunting. Robert sits on the platform intent on the proceedings. The train crew have adopted him as their mascot. A triumphant wave of the cloth, that is untucked from his collar, signals the crew that operation haircut is over, and all go their ways in peace.—*From "The Victorian Railways News Letter."*

Transport Pre-View

(*Dr. Lyle Borst, of the University of Utah, has said that an atom-powered locomotive would cost about* £430,000 ($1,200,000) *to build, and it would have to be cleaned out every six months with chemical plant costing* £3,500,000)

The time may come one day, you know,
When we may travel to and fro,
Propelled and powered by kind permission
Of what is known as nuclear fission.

A few pounds of uranium
Could blow us all to kingdom come,
Or keep a train in operation
For two whole years, without cessation.

Doubtless some genius will unravel
The nuclear way to cheaper travel,
Just now, man, rightly apprehensive,
Tends to find ways and means expensive.

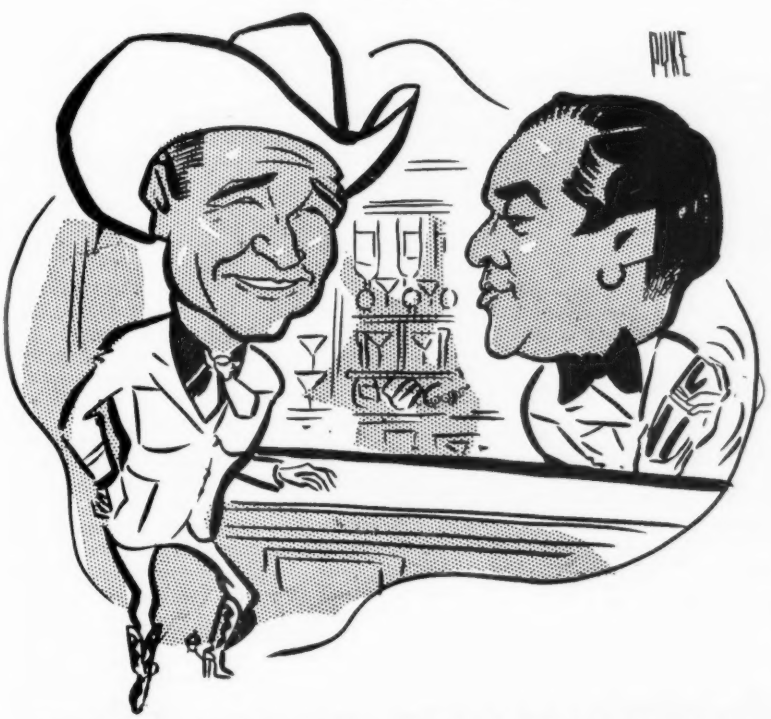
For our imagination balks
When some be-whiskered boffin talks
Of half-a-million per machine,
Plus millions more to keep it clean.

The nosing into this and that,
Which killed the legendary cat,
May, if pursued year after year,
Bring us full circle, as it were.

But, should we land back where we started,
There's no need to be broken-hearted;
Oblivious of by-gone boloney,
We'd get along—on Shanks's pony.

A. B.

In the "Enterprise" Bar



Mr. Joe Kearns, well known to travellers by the G.N.R. Dublin-Belfast "Enterprise" express, shown by the Dublin cartoonist Pyke at work in his bar, with a Hollywood cowboy passenger, Mr. Roy Rogers

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Railway Results for 1953-54

For the second year in succession the railways have shown a net working profit. Figures released by the Railways Commission for the financial year ended March 31, 1954, show a net revenue of some £400,000 on the year's operations. This figure disregards interest charges on capital and is comparable with an amount of £82,272 earned in the previous year and with a loss of £1,202,488 in 1951-52.

Freight tonnage did not quite reach the record of 10,000,000 tons handled last year. Total passenger journeys showed an increase. Despite reductions in some costs, it was necessary to increase charges twice during the year to meet increases in other costs, the Commission states.

The aim of the Commission has been to reduce operating costs to a minimum consistent with an up-to-date, efficient service. The closing of some uneconomical branch lines was effected after full investigation. The Commission emphasises the urgent need for more staff, more motive power, and more wagons to meet increasing traffic and to give the best possible service to the public.

UNITED STATES

Reading Railway Safety Record

Up to the end of 1953 the Reading Railway achieved the remarkable record of having operated for eighteen months continuously without a single fatality to one of its employees. During the year 1953, also, reportable accidents to Reading employees were reduced by 19 per cent compared with the number in 1952.

Double-Deck Cars for C. & N.W.R.

Such has been the success of the double-deck cars introduced by the Chicago, Burlington & Quincy on its suburban passenger service between Chicago and Aurora that the Chicago & North Western has ordered 16 stainless steel cars of the same type. Each is 85 ft. long and has a maximum height of 15 ft. 10 in. above rail. On the main floor, seats are arranged six abreast on either side of a central gangway; the cars are entered through double doors at the centre, which admit to a spacious vestibule, and from this, stairways lead to galleries along the length of the car on both sides which provide rows of single seats at a higher level.

The seating capacity of each car, totalling 169, more than doubles that of the conventional cars now in use. The equipment includes lavatories, stainless steel fittings, automatically controlled heating and air-conditioning, roller bearings, and tightlock couplers. Lighting and heating are provided independently of the locomotive by a propane-powered engine and generators installed in a separate vehicle, which carries sufficient fuel for two days' continuous operation.

The height of these cars will make it necessary to raise the roof of the C. & N.W. Chicago terminal by 12 in. to obtain sufficient clearance. This lifting is also made necessary by the forthcoming introduction of dome cars on the joint C. & N.W.-Union Pacific-Southern Pacific Chicago-Pacific Coast services, and is being put in hand.

ITALY

Railway Problems in Florence

For many years the development of the city of Florence has been hindered by the alignment of the railways which almost surround the inner part of the old city and cut it off from its suburbs. These lines, which connect the existing stations of Santa Maria Novella, Campo di Marte, Porta al Prato and Rifreddi, are crossed by underbridges, overbridges and level crossings, which constrict the street system. There is one section at Campo di Marte Station nearly two miles long without crossing facilities, a deficiency made particularly irksome by the location of the Municipal Stadium beyond this barrier.

Two remedial schemes are now receiving detailed consideration. One prepared by the State Railways envisages lowering the lines on two sections so that at least the level crossings would be abolished. A more radical scheme, prepared by the City authorities, proposes not only lowering the lines over a much longer section which includes Campo di Marte Station, but also the removal of the large goods stations at Porta al Prato and Campo di Marte to a new site near Castello Station, outside the congested part of the city. It would then be possible not only to restore proper road communications throughout the area, but also to gain the large areas of the displaced goods station for redevelopment.

SWITZERLAND

High-Speed Railway

As may be recalled from a note in our December 12, 1952, issue, a Swiss engineer, Dr. Rudolf Meyer, possibly inspired by the recent trials with a new type of monorail vehicle in Germany, has invented a railway with two rails consisting of two box girders of hollow-rectangular cross-section, supported by pillars. The vehicles would be fitted with rubber-tyred vertical running wheels and horizontal guide wheels, and would be suspended in such a way that the centre of gravity would lie at rail level.

The proposed car would be 36·2 m. long, carried by two sets of 2 × 3 independently designed and independently motored half-axles so that there would be no need for gears. The wheels would be 1 m. in dia. and would thus, at a running speed of 280 km.p.h., have a rotating speed of 1,485 r.p.m., corresponding to that of commercial-type electric motors. The overall width of the car would be 3,250 mm., and the rail gauge 4,400 mm. Four of these vehicles, combined in a single articulated train, would have comfortable seating accommodation for 196 passengers. The laden weight of such a train would be 34 to 43 tons, according to the type of equipment. Even at a sustained speed of 280 km.p.h., the temperature rise in the tyres running on the smooth box girders of reinforced concrete would not be excessive and could be reduced by air cooling devices.

The car body would be constructed of light alloys as a self-supporting shell structure. If all wheels were motored, an individual motor power of 30-38 kW. would suffice to obtain the desired speed. Because of the lightness of the vehicles, the concrete pillars carrying the rails would not require heavy foundations.

DENMARK

Bridge over the Sound

Six important Danish and Swedish firms have collaborated in drawing up a plan for a connection between Denmark and Sweden across the Oresund. Their first proposal issued about a year ago was for a combined road-rail bridge between Copenhagen and Malmo, but in its latest form the scheme is for a road connection only. It would cross the western part of the Sound on a dam and then by tunnel to gain the island of Saltholm, which would be traversed on a dam. The eastern (Swedish) channel would be crossed on 4-mile bridge and dam. The total distance is 11¼ miles.

The general managers of the Danish and Swedish State Railways have announced that they consider it essential that a connection should include both road and rail, and that if a combined road and rail bridge is built, it would be better to place it between Elsinore and Hälsingborg. This route would be of more value for the through traffic between Scandinavia and Western Europe, and also because a combined bridge there would be considerably cheaper than a tunnel and bridge connections between Copenhagen and Malmo. The rail connections on shore would be much cheaper at Elsinore than at Copenhagen. The general managers recommended that the whole problem, with all its aspects should be investigated by a joint Swedish-Danish committee. At a meeting of the Danish and Swedish Traffic Ministers on February 8 it was agreed that a committee, consisting of 34 members, should be appointed in each country to undertake more investigations.

Sixteenth International Railway Congress

Wear of Rails on Curves

Running effects of traction units, curve-laying, investigations and remedies

QUESTION 10 on this subject, to be discussed at the forthcoming session in London, is divided into three parts (*a*) running effects of locomotives and motor coaches with motor bogies; (*b*) characteristics of track-laying on curves and details of rolling stock liable to cause premature wear of the rails; and (*c*) results of the investigations made, and proposed remedies. Use of rail-lubrication processes. This order of the parts, however, is not followed in the report below.

The question was addressed to—among others—66 railway administrations in practically all European countries and their dependencies, excluding Scandinavia and the United Kingdom, and in other Mediterranean countries; only 26 replied. Their replies are summarised in a report by Monsieur L. Ripert, Chef du Service de la Voie et des Travaux de la Société Générale des Chemins de fer Economiques (France).

The report begins with a number of diagrams submitted by the various railways showing the chamfering of outer railheads and wear on inner rails of curves on both standard- and metre-gauge systems. All show normal varieties of excessive wear, except in the case of the Swiss Federal Railways, who turn their rails and whose rail heads on sharp curves eventually take the form of a comparatively narrow ∩-shape.

Relations Between Curvature and Wear

The sharpest curves and the radii at which excessive or abnormally rapid wear begins to take place are tabulated railway by railway. In general, it may be said that on standard-gauge lines outer-rail wear is most pronounced on curves of 25 ch. and sharper, and on metre-gauge lines on those of 17½ ch.

Among the various notes in the replies on the different forms taken by wear is one from the Cameroons mentioning that much larger shreds are torn off the rails by flange-grinding under diesel than under steam traction. It is also clear that the deformation of the web by outward bending is often noticed on many of the railways concerned.

The curve characteristics having a predominant influence on wear are considered to be (1) irregularities in curvature, (2) small-curve radii and their relation to speed, (3) excess in cant wearing the table of the inner and deficiency in cant causing chamfer wear on the outer rail, (4) insufficiently long transition curves inducing lateral wear, (5) excessive speeds on falling gradients, and (6) too-slack or too-tight gauge—the former by increasing the angle of attack of the flange and the latter by grinding action. Defects in maintenance and climatic and atmospheric conditions also have effects upon wear.

Influence of Features of Rolling Stock

The more important features of rolling stock causing wear in rails on curves are generally considered by the replying administrations to be (*a*) either excessive or inadequate length of wheelbase governing the angle of flange-thrust, (*b*) stiffness in the control of bogie and bissel rotation, and inadequate methods of guiding them, (*c*) the influence of the position of loads on the effect of oscillation, (*d*) suspension, especially in the case of nose-suspended motors, and (*e*) size of wheel and profile of tyre. Several administrations report a marked increase in lateral wear due to the introduction of electric and internal-combustion traction.

Effects of Locomotives and Motor Coaches with Driving Bogies

This wear, mainly caused by motor bogies in the shape of lateral erosion, is due to the following:—(*a*) The weight on the axles, particularly if unsprung as with nose-suspended motors, causing severe dynamic effects in track irregularities and in turnouts. In addition, the gyroscopic inertia of the turning masses, the motors and axles, tend to make the bogie continue to travel in a straight line; study of this gyroscopic effect does not yet permit of its evaluation; (*b*) the angle of thrust, especially with a short wheelbase, and slack gauge cause oscillations; moreover, the pull on the couplings tends to increase the angle of thrust exerted by the motor coach or locomotive, but decreases that by the trailing vehicles; (*c*) the distance of the motors from the bogie pivot affects the inertia of the whole; this is most marked in some diesel bogies and causes greater wear than in the case of those driven by electric motors; (*d*) lack of synchronisation between the motor torques in the different axles may cause hunting; (*e*) the damaging effect of some six-wheel bogies may be the result of increased lateral pressure by the leading flange due to the presence of the intermediate axle.

A combination of these factors appears to encourage "floating" or "crab-running" in driving bogies, thus increasing the irregularities in the wear of the rails. The grinding of axles by control devices, such as transverse coupling of bogies, reduces the angle of thrust of the leading wheels and regulates the running of bogies.

The report devotes considerable space to the description and illustrations of methods and apparatus for measuring and recording rail-war, modifications in the structure of the steel, and permissible limits of wear. Most railways have made observations rather than carried out systematic investigations. Several have tried extra-hard rails, and the Swiss Federal administration has been trying various qualities of steel since 1926. Generally, a combination of high-resistance steel assisted by lubrication of the inner side-face of the outer rail and also, in some cases, by check rails, has been found to be most beneficial. Of almost equal importance are reduction in the extent of slack gauge—usually from about 20 mm. to 10 mm., but on some lines to zero—modification in the cant, and occasionally joint-staggering.

Considerably increased resistance to wear on sharp curves under heavy traffic is reported to be usually obtained by using either (*a*) normally tougher rails, (*b*) those with heads treated by the sorbitic or martensitic method, either throughout the whole rail-length or only at both ends, or (*c*) rails of a compound steel in which only the wearing surfaces of the head are of hard steel.

It is estimated that flange and rail lubrication reduces lateral wear by from 30 to 50 per cent. On lines with numerous curves flange lubricators on the vehicles are the more economical, but for isolated or infrequent sharp curves fixed rail lubricators are justified.

LEEDS TO ST. PANCRAS SLEEPING CAR SERVICE.—First and third class sleeping accommodation has been provided since May 1 on the 3.16 a.m. Sunday train, Leeds City to St. Pancras. Passengers can take over their sleeping berths at 11 p.m. on Saturday evening.

B.T.H. EXHIBITS AT THE MECHANICAL HANDLING EXHIBITION.—The British Thomson-Houston Co. Ltd. will exhibit a comprehensive range of electrical apparatus for application to all kinds of mechanical handling equipment, at the Mechanical Handling Exhibition to be held at Olympia, London, W.14, on June 9-19. The display will include among others, electric motors from fractional horsepower upwards, electric control gear, electro-hydraulic thrusters, and typical applications of electronic equipment for automatic control of industrial processes. Among the exhibits on display will be a 15/20-ton overhead crane, a variable-speed a.c. commutator motor and associated control gear. The electronic equipment will include photo-electric relays, and a high-speed batch counter capable of operating at a maximum speed of 40,000 counts a minute.

Reorganisation of Freight Working at Peterborough, Eastern Region

Operating efficiency improved after reallocation of functions and closing of three yards

THE Eastern Region of British Railways has completed a reorganisation of the marshalling yard facilities at Peterborough, as a result of which three yards have been closed and a saving made of £100,000 a year.

Efficiency of working has been improved and unproductive shunting of more than 1,200 wagons a day eliminated. It has also been found possible, under the new working, to close the former Midland & Great Northern joint line at night, for one turn of duty, between Peterborough and South Lynn, 36 miles.

Traffic Flows

There are two principal flows of freight traffic through Peterborough: one north and south along the former Great Northern main line, the other between east and west. The exchange between the two flows is small, about 5 per cent of the total, and it has been relatively easy to treat the east-west flow, the subject of reorganisation, in isolation.

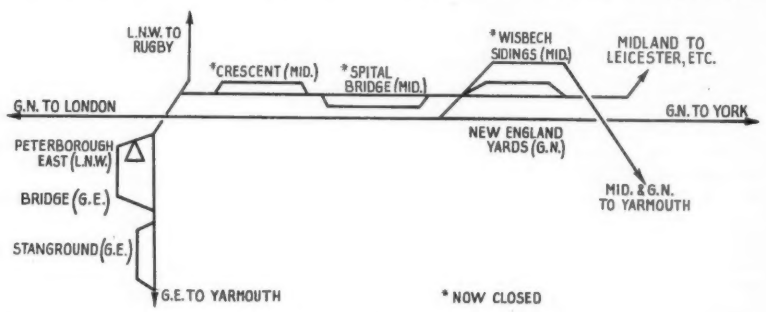
The east-west flow consists in the westerly direction of the agricultural and industrial products of East Anglia; imports through London and Parkeston; special traffic in coke to the Northamptonshire ironfield; and mineral empties returning to the Derbyshire, Nottinghamshire, and South Yorkshire coalfields. Of some 800 wagons a day, 40 per cent of loaded wagons are exchanged to the Midland Division and 60 per cent to the Western Division of the London Midland Region.

Eastbound, the flow is of coal from the South Yorkshire, Nottinghamshire, and Derbyshire coalfields to East Anglia generally, and of the industrial products of the Midlands and North West. Of some 1,100 wagons daily, about 70 per cent are for East Anglia via Whitemoor, 15 per cent for the Midland & Great Northern line, and 15 per cent for Peterborough itself.

Former methods of dealing with traffic at Peterborough and the location of the yards originated in the competition between private companies before grouping in 1923. The Midland and the Great Northern Railways built a joint line across North Cambridgeshire and through Norfolk down to Yarmouth and diverted to it all the traffic they could.

The Great Eastern Railway also served all the towns on the M. & G. N. joint route: Wisbech, King's Lynn, Fakenham, Aylsham, North Walsham, Yarmouth, Lowestoft, Cromer, Sheringham, and Norwich, and the cross-country traffic was split between two routes, the equipment for handling it being duplicated.

The Midland Railway had marshalling yards at Wisbech Sidings, Spital Bridge, and Crescent; the G.E.R. at Peterborough Bridge and Stanground; the L.N.W.R. at Peterborough East; and the G.N.R. a group of yards at New England.



Relative positions of marshalling yards in and around Peterborough, showing the railways before grouping in 1923

Former Functions

The uses of the yards at Peterborough were as under:—

Wisbech Sidings (M.R.): To receive from the M. & G.N. Joint, the G.N., the L.N.W., and the G.E.R., traffic for the Midland and beyond, and to marshal it into long-distance trains for the North and Midlands.

Spital Bridge (M.R.): To receive from the Midland, traffic for the G.E., the M. & G.N. Joint, and the G.N. The G.E. traffic was tripped to Stanground; and the M. & G.N. Joint and G.N. to Crescent.

Crescent (M.R.): To receive from the G.E., G.N., and Midland traffic for the M. & G.N. Joint, and to forward it largely unmarshalled. Crescent also had a local function for sidings nearby.

Peterborough East (L.N.W.): To receive from the G.E., and the M. & G.N., traffic for the L.N.W. route, and to despatch it, very largely to Welham nearby for further marshalling.

Peterborough Bridge (G.E.): To receive from the G.E., traffic for the L.N.W., Midland, M. & G.N. Joint and the G.N., and to despatch it to the yards previously named.

Stanground (G.E.): To receive from Spital Bridge and New England traffic for the G.E. and despatch it, almost entirely to Whitemoor, 15 miles away.

Staging

Traffic from the Midland and L.N.W. was staged: *To the G.E.:* Spital Bridge—Stanground—Whitemoor; *to the M. & G.N. Joint:* Spital Bridge—Crescent; and *to the G.N.:* Spital Bridge—Crescent—New England.

Traffic from the L.N.W. was staged in the same way as the Midland, because although the L.N.W. direct route to Peterborough was Rugby—Wansford—Peterborough East, the freight trains ran by the longer route, Rugby—Luffenham (Midland)—Spital Bridge, so as to detach the traffic for the M. & G.N. Joint at Spital Bridge.

Traffic from the G.E. was staged: *to the Midland:* Whitemoor—Peterborough Bridge—Wisbech Sidings; *to the M. & G.N. Joint:* Whitemoor—Peterborough Bridge—Crescent: and *to the L.N.W.:* Whitemoor—Peterborough Bridge—Peterborough East L.N.W.

Concentration

It was evident that to serve East Anglia best, Whitemoor was the right point of concentration for the whole of the traffic sorted at Peterborough except that for Peterborough itself.

The traffic for East Anglia, including the M. & G.N. Joint, would travel on long-distance trains from Chaddesden, Toton, Birmingham, and the other principal yards in the Midlands direct to Whitemoor for distribution. Local traffic for Peterborough to go to New England G.N.

As Whitemoor could not absorb the whole of the work, one up and one down yard at Peterborough had to remain open. Of the six choices, three (Wisbech Sidings, Spital Bridge, and Crescent) did not lie on the direct route from the L.N.W. via Wansford but had to be reached circuitously via Luffenham. The choice, therefore, fell on Peterborough East and Stanground.

Westbound Problems

With the westbound traffic the problem was how to undertake elsewhere the very detailed marshalling which Wisbech Sidings undertook with its 26 sidings and some 40 separations.

The first step in this was a small one: to combine Peterborough East, L.N.W.,

and Peterborough Bridge, G.E., by coupling the single-ended sidings of the L.N.W. yard to the G.E. sidings and making one double-ended yard of 15 sidings.

This was completed in 1952, and accelerated a fairly large block of traffic and produced a saving of some £3,000 a year. The 15 sidings at Peterborough Bridge, however, did not touch more than the fringe of the 40 separations to be transferred from Wisbech Sidings added to five from Crescent and 20 which Peterborough Bridge were already making.

Reserve Capacity: Whitemoor

Common user and subsequent purchase of privately-owned wagons had considerably reduced the amount of work to be undertaken in the Whitemoor Down Empties Yard, and this yard, with 42 sidings, situated at the focus of all the main freight routes in East Anglia, was therefore available to become a main classification yard for express freight.

Accordingly, in the Spring of 1953, the Down Empties Yard at Whitemoor, besides a small function for empties, began to make 40 separations of loaded wagons. Peterborough Bridge undertook 26 separations.

New Express Freight Services

New or accelerated long-distance express freight services from Whitemoor were also introduced as under:—

New Services

1.30 a.m. MX class "H," Whitemoor to Welham
1.45 a.m. MX class "C," Whitemoor to Niddrie West (Edinburgh)
2.20 a.m. MX class "D," Whitemoor to Ardsley (West Riding)
3.5 a.m. MX class "D," Whitemoor to Crewe
4.45 p.m. class "D," Parkeston to Birmingham Curzon Street
9 p.m. class "E," Whitemoor to Birmingham Camp Hill
10.5 p.m. SX class "D," Whitemoor to Birmingham (Aston)

Accelerated Services

3.40 a.m. MX class "F," Whitemoor to Colwick (Nottingham), accelerated from 5.50 a.m.
4.45 a.m. class "D," Peterborough East to Crewe, accelerated from class "E"
9.35 p.m. class "E," Whitemoor to Colwick, accelerated from class "F"
9.50 p.m. class "D," Whitemoor to Stockton, accelerated from class "E"
10.5 p.m. class "C," Thames Wharf (London) to Niddrie, accelerated by 20 min. from Whitemoor

On the four new trains which start from Whitemoor westbound the traffic avoids being staged at Peterborough East (G.E.) and again at either Peterborough East (L.N.W.) or Wisbech Sidings (Midland).

On all other trains one stage at Peterborough has been cut out, except that wagons from the M. & G.N. Joint via Sutton Bridge, which previously went into Wisbech Sidings and forward direct from there for the Midland Division, have no advantage as an alternative stage at Peterborough East is substituted.

The 4.45 p.m. Parkeston Quay to Birmingham offered a new service for the traffic from the Zeebrugge train ferry, the Hook of Holland, Antwerp, and Ipswich to reach Birmingham in time for the market.

Eastbound Traffic

Eastbound, the problem was different. Instead of many streams of traffic fanning out from a focal point to the Midlands and North, many streams had to be concentrated each conveying traffic for three directions: Peterborough itself, the M. & G.N. Joint, and Whitemoor. Of the three, Whitemoor was preponderant, 70 per cent of the whole.

With the closing of Spital Bridge and Crescent, the trains from the Midland and L.N.W. were extended to Stanground.

Out of 26 trains 17 conveyed traffic for Whitemoor only. An attempt is being made to work these through to Whitemoor, eliminating the last remaining stages at Peterborough. The other nine trains conveyed traffic for Peterborough itself, the M. & G.N., and the G.N. Trains to the M. & G.N. start from Stanground.

Revised Functions

The present functions of the yards therefore are:—

Peterborough Wisbech Sidings	Closed
Spital Bridge ...	Closed
Crescent	Closed
Peterborough East Bridge ...	Combined. Receives traffic from M. & G.N. and G.N. Also overspill from Whitemoor for which Peterborough makes direct trains and Whitemoor does not. Forwards to Midland and L.N.W. on through trains and G.N. by trip
Stanground G.E. ...	Receives from Midland, L.N.W. and G.N., traffic for G.E., M. & G.N. and Peterborough. Despatches to M. & G.N. and G.E.
Whitemoor Down Yard	Receives from G.E. Despatches to Midland and L.N.W. on long distance trains with overspill to Peterborough East

Re-routing

As a result of the re-organisation at Peterborough, it has been found possible to divert trains on the night turn of duty on the M. & G.N. route (South Lynn—Wisbech North—Peterborough) to the G.E. route (King's Lynn—March—Peterborough) and to close the M. & G.N. route for one turn of duty with resultant economy.

RAISING A 4,000-TONNE ROAD BRIDGE.—The use of the 50-cycle single-phase 25,000 V. system of electrification on the Valenciennes-Thionville line of the French National Railways necessitates a greater clearance for the catenaries than with the 1,500 V. d.c. system. The normal clearance on the S.N.C.F. is 4·28 m. (approximately 14 ft.), but on the Valenciennes-Thionville line, 4·65 m. (15 ft. 3 in.) is required.

To attain this standard it was necessary to increase by 42 cm. the clearance of the road bridge which carries a route nationale over the principal tracks at Thionville. The bridge, which is 160 m. long and weighs 4,000 *tonnes*, is composed of six spans which rest on a series of metal supports on concrete foundations.

Twenty-four 200-*tonne* jacks and twelve 100-*tonne* jacks were sited appropriately alongside the thirty-six supporting pillars, which were unbolted from the baseplate attached to the foundations. Sheet piling was constructed around the principal pillars and the jacks set to work to raise the appropriate section of the bridge which was pivoted on the roller support at the other side of the track. The actual amount of lift decreased from the maximum of 42 cm. (1 ft. 4½ in.) over the electrified tracks to 19 cm. (7½ in.) over the pillars nearest to the pivoted end.

When the bridge had been raised the requisite amount, plus a margin of 45 mm. (1¾ in.), required to give clearance for screw heads, welded metal sections prefabricated to the necessary size, according to location, were bolted into position between the bottom of the pillar and the baseplates.

The work was begun at 2.30 p.m. on a Sunday, and without working during the night, it was finished by 1 p.m. the next day. There was no material interruption to road and rail traffic.

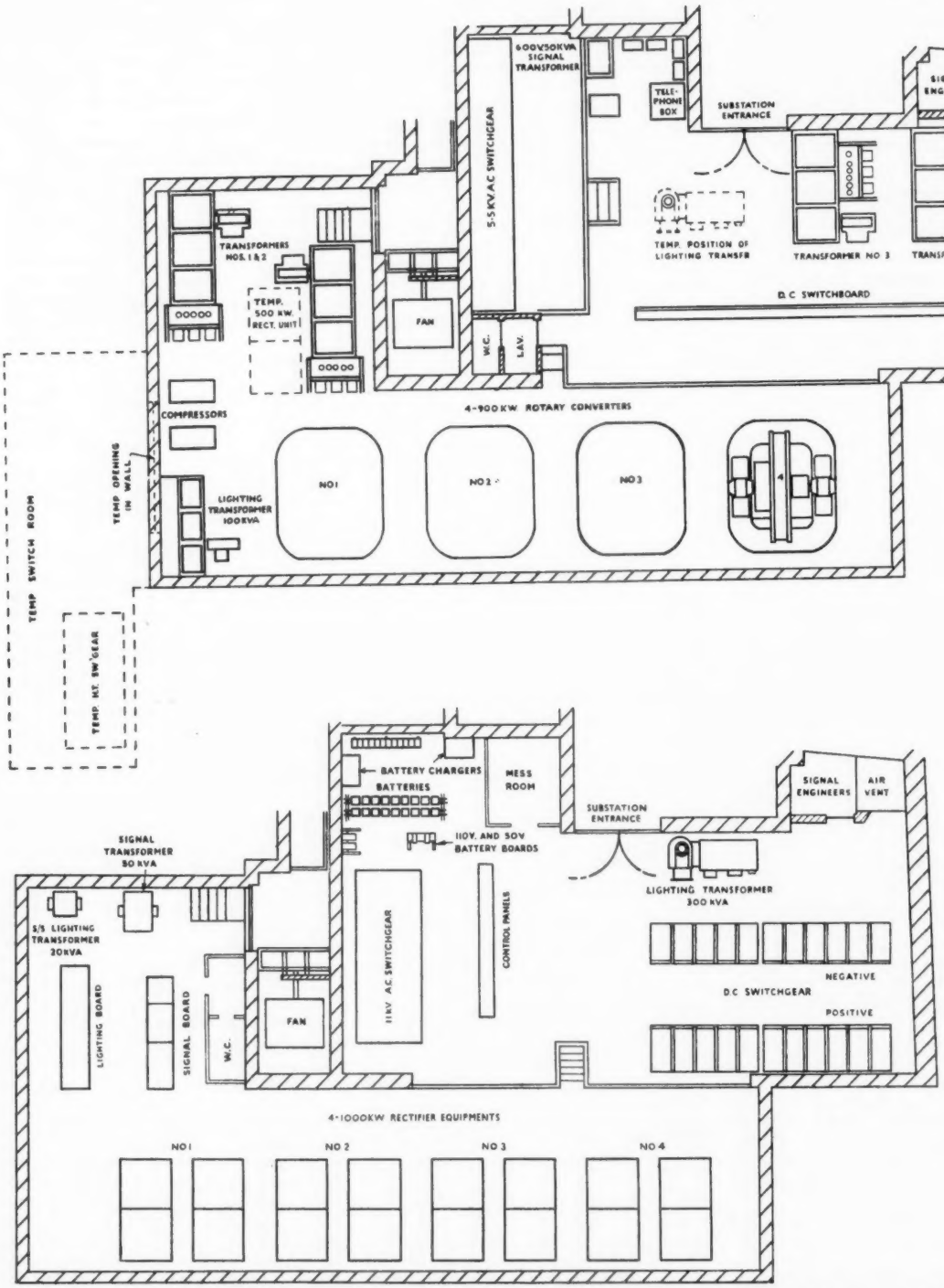
POINTS OPERATION FROM LOCOMOTIVE CAB.—An application of radio to switch operation from a moving train has been introduced by the Atchison, Topeka & Santa Fe Railway at Carlsbad, New Mexico. From the station yard there a branch runs to a local mine, and as it would be uneconomical to provide a signalman at the junction for the infrequent train movements to and from the mine, and it was desired if possible to avoid stopping the mine trains while the points were being worked, a method of long-distance operation from the train itself has been evolved.

Normally the points concerned are set for the main track, and on leaving the yard the mine train trails through it, opening it against spring pressure. On the return journey, a portable transmitter installed on the locomotive is used to open the points for the mine track. This transmitter is equipped with two audio oscillators, worked respectively by a red and a green key.

When the train is about a mile from the points, one or other key is thrown; the red key starts a transmission on 1,735 cycles, and the impulses, received by the points apparatus and amplified, work a relay which causes an ordinary power points machine to move the points, setting it for entry to the yard and clearing the appropriate signal. If the green key is moved, transmission is on 2,080 cycles, and the points are then set for the main track.

Track circuits prevent any movement of the points if a train is passing over it. The points can also be moved by pressing a button in a cabin at the lineside.

Re-equipment of Bond Street Substation, London Transport



Plans of site before (above) and after the changeover. The dotted lines show temporary additions to facilitate the work

Re-equipment of Bond Street Substation, London Transport

Rotary converters replaced by rectifiers under site difficulties

BOND STREET substation, which serves one of the busiest sections of the Central Line of London Transport, has been entirely re-equipped with modern plant. The work was successfully completed to schedule, and without interruption to the supplies of electricity to the railway during the complex changeover process, despite considerable site difficulties.

The substation lies behind the ticket hall of Bond Street Station, which is in Oxford Street between Oxford Circus and Marble Arch, in a heavily built-up area where there is no room for expansion and where the questions of noise and fire risk assume considerable proportions. The fact that access from the street to the substation is normally through the station ticket hall imposes heavy restrictions on the size and weight of equipment and material allowed to pass through it.

The Central Line was opened as the Central London Railway between Shepherds Bush and the Bank in 1900, and many of the rotary converters still in use at its various substations are the machines then installed. Since 1928 they have been running at a speed one-third higher than they were designed for, as a result of the changeover in high-tension supply from the 25 cycles of the original generating station at Wood Lane to the 33⅓ cycles of Lots Road power stations. Their useful life has thus been exceeded and this, combined with the projected change in supply frequency from 33⅓ to 50 cycles and the necessity to provide additional output to cater for increased traffic, made the early re-equipment of some of these older substations, both on the Central and other lines, an urgent matter. At the same time it was thought desirable to install modern static conversion plant arranged for remote supervisory control.

The substation at Bond Street is one of the first to be dealt with on the Central Line; a necessary preliminary was the laying of two new 11-kV. cables from Notting Hill Gate to replace the existing 5·5-kV. supply.

The complete changeover was undertaken by the Hackbridge & Hewittic Electric Co. Ltd. in collaboration with the Chief Electrical Engineer of London Transport. The operation was programmed to be carried out in two main stages: the first consisting of the replacement of the four original rotary converters by an equal number of Hewittic mercury vapour rectifiers; and the second the re-equipment of the switchgear section, which involved the installation of a bank of 11-kV. oil circuit breakers, two d.c. switchboards —one embodying the latest truck-type high-speed circuit breakers and control panels on the positive busbar and the other withdrawable contractors and panels on the negative side—auxiliary transformers and switchgear for lighting and signalling supplies, and so on, and the supervisory control gear. Re-equipping began early in 1953 and the first main stage was successfully finished in September of that year.

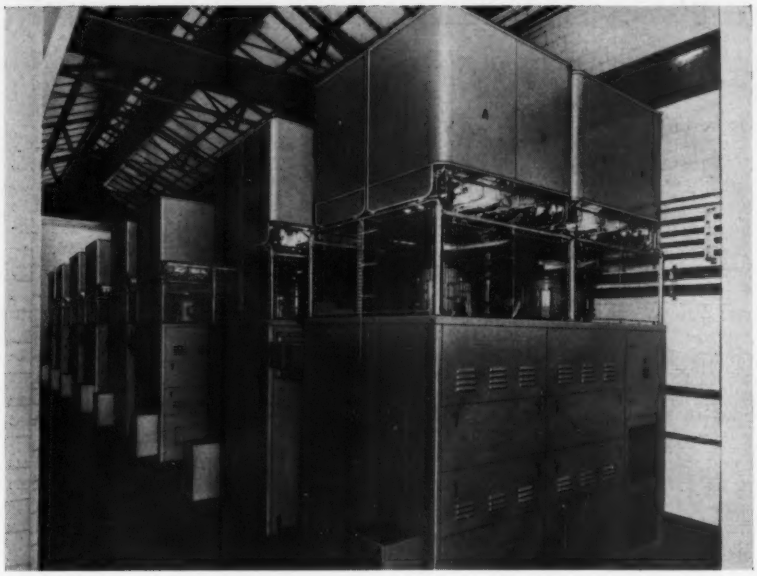
Three main problems had to be overcome: (*a*) to provide new plant with higher capacity and increased overload rating, which at the same time was compact and capable of easy installation in the restricted space available; (*b*) to carry out the changeover without reducing output; and (*c*) to remove the original rotary converters, each totalling 30 tons, without obstructing the station entrance or otherwise impeding normal passenger movement.

The relationship between the required output and the restricted floor space available for the rectifiers did much to influence the design of the equipment; the problem was resolved by the London Transport engineers' decision to combine the rectifier and transformer into one unit, in which the individual parts were so arranged in sections as to permit of their being manœuvred in a small space by only two or three men. The transformers and auxiliaries were then designed to form the base compartments of the equipment over which the cradles enclosing the rectifier bulbs are fitted.

Each 1,000-kW. rectifier is made up of two self-contained 500-kW. units, which together occupy about the same floor space as was taken by each rotary converter. By combining the transformer with the rectifier not only has all interconnecting cabling been dispensed with, but valuable space in the switchgear section originally taken up by rotary transformers has been saved for use in accommodating the new d.c. switchgear and additional items incorporated in the supervisory control scheme.

The supply is taken from London Transport's 11,000-V. system through 3/6 phase transformers providing the correct pressure for giving a 630-V. d.c. output. Oil cooling is entirely dispensed with, and the transformers are of the totally enclosed dry-air insulated type. Cooling is by a fan-cooled air-to-air heat exchanger through which

New truck-type d.c. switchboards in position



New 1,000-kW. mercury arc rectifiers

the air within the transformer case is circulated by a second fan and directed constantly, by means of baffles, through the core and windings and also through the adjoining compartments housing the auxiliary transformer, interphase transformer and fan choke. The phase angles of each pair of transformer primaries are displaced, one 15 deg. forward and one 15 deg. backward, resulting in 12-phase operation of each 1,000-kW. set.

The Hackbridge & Hewittic Electric Co. Ltd. were the original designers and manufacturers of the closed-air-circuit type of transformer, which was developed expressly to meet the requirements of the London Transport system. The first such set of rectifier transformers has been in regular satisfactory service since 1948, and others have followed since. The Bond Street equipments represent the latest development of this new principle, which has practically eliminated the fire risk arising from transformer failures.

Six three-anode rectifier bulbs are employed on each unit, and these are mounted in two triangular groups each cooled by a single fan. The exciter unit, anode fuses and anode chokes are contained in a separate compartment situated alongside the main transformer. Apart from the fan, the only moving part is the starting relay.

To maintain the required output of the substation it was necessary to install new equipment before removal of its existing counterpart. This presented a problem, because of lack of space, but the difficulty was somewhat overcome by opening an end wall and building, on temporarily rented land, a small annexe to house temporary high-tension a.c. switchgear. Access was possible to this annexe from an adjoining yard, and from this point all the heavy machinery was handled, leaving the public entrance to the station free. Some plant, however, had to pass through the passenger station after traffic hours.

Sequence of Operations

The first step inside the substation was to install the new lighting transformer in a temporary position to enable the old one to be removed so as to provide a handling space.

The rotary converters were housed in the long narrow section of the substation, with a very restricted crane height. This and other detail factors combined to make it essential to remove the converter nearest the annexe doorway in each case. Lack of space prevented installation of a complete 1,000-kW. rectifier before dismantling began. Accordingly, operations on main plant began by temporarily erecting one of the 500-kW. units which could just be accommodated between No. 1 and No. 2 rotary converter transformers in an adjoining section.

This was followed by demolition of No. 1 rotary transformer and the temporary erection of the second half of this rectifier equipment (No. 4) in its place. The capacity of both halves of this equipment was increased by the addition of two bulbs in each unit, to cover the transitional period, for, as each rotary converter was disconnected, some reduction of the overall capacity of the substation was incurred until the replacement rectifier was installed. This increased overload capacity of the rectifiers was relied upon to provide a sufficient margin of power to cover demands during peak periods.

Meanwhile, removal of the first rotary converter and its concrete foundation was proceeding and upon relevelling of the floor the next rectifier (No. 1) was placed in position. The difficulty of removing the remaining machines was solved by taking advantage of the unique constructional characteristics of the rectifiers, the partial dismantling of which permitted the 11-ton armatures and yokes to be withdrawn past the rectifier with the minimum of clearance. This involved the removal of three bulbs and the associated cooling fan on each unit.

At first it was thought that these changeovers would have to be carried out during the nightly shut-down periods, but by effecting preliminary dismantling of rotaries and so on, and with accurate planning and timing of

Local substation control panel

operations, they were successfully achieved during the morning off-peak periods. The climax was reached when, to withdraw the fourth rotary converter all three rectifiers were dismantled as described to allow its passage, re-assembled and put on load within four hours. The armature was held in readiness on the crane beforehand and re-assembly was so ordered that the adjoining rectifier (No. 3) had actually resumed service within one hr., by the time the armature had passed by the remaining rectifiers and had been loaded on to the waiting vehicle. The temporarily installed rectifier (No. 4) with its four additional bulbs had carried the load wholly during this period and, with the transfer of this to its permanent position, the first main stage of the changeover was brought to its successful conclusion.

The rectifiers necessarily were commissioned on the 33⅓-cycle supply, but their design is such that the only change that will be required when the frequency is raised to 50 cycles will be the replacement of the fan motors and adjustment of exciter and anode chokes.

One d.c. circuit breaker controls each 1,000-kW. unit and, until the d.c. switchboard controlling the rotary converters could be dismantled, each rectifier breaker was placed alongside its appropriate rectifier equipment. With the removal from service of the last rotary converter the second main stage of the operation was commenced when the obsolete d.c. switchboard was removed and space made available for the installation of the new d.c. switchgear in its permanent position.

D.C. Switchgear

The d.c. positive breakers are of the high-speed truck type and are arranged in a bank of ten with a bus-coupler contactor positioned in the centre. These control the four rectifiers, four track feeders and two escalator feeders. Each breaker is electrically interlocked with a corresponding negative contactor, so that the contactor will open immediately after its breaker has tripped. The negative contactors are also of truck type, and the lay-out is a replica of the positive, arranged face to face, with a passage way between providing common withdrawal space. This allows servicing of the cubicles and the lay-out assists in checking between the positive and negative of individual circuits.

All rectifier breakers are interchangeable as are also the track and escalator feeder breakers. Breakers and contactors are electrically closed by a 110-V. battery and tripped by a 50-V. battery. The rectifier breakers are arranged for reverse tripping and the feeders for forward tripping.

Experience has shown the desirability of being able to feed separate sections of the track and accordingly the d.c. switchgear at Bond Street is arranged to enable the tracks eastwards of the sub-station to be separated from those westward. The high-tension switchgear comprises duplicate busbars and seven 11-kV. oil circuit breakers of 350 mVa. rupturing capacity arranged as follows: two incoming feeder breakers, four rectifier breakers and one lighting transformer breaker. Protection against over-current and earth leakage is provided. Each rectifier oil circuit breaker is interlocked electrically with its corresponding d.c. breaker so that in the event of an internal fault, that rectifier equipment is isolated from the supply.

Switching on simply requires the closing of the associated oil circuit breaker after which the rectifier strikes up, the d.c. breaker closes, followed by the negative contactor. This completes the rectifier connection to the busbars.

Accommodating the new 11-kV. switchgear involved demolishing a gallery on which the old 5·5-kV. switchgear stood, and also building a new lavatory and a messroom for the sub-station staff.

High-tension a.c. switchgear

Supervisory Control

The whole of the switchgear is designed for operation by remote supervisory control which has not yet been installed. A centralised control panel, designed and built by London Transport engineers has been installed in the substation and this gives all indications and alarms. Accordingly, such operations as starting and stopping the rectifier equipments and the closing and tripping of h.t. and d.c. feeder breakers will be, for the present, carried out by means of local control.

Removal of the heavy rotating machinery and positioning of the rectifier plant were effected by E. W. Rudd (Heavy Haulage Service), British Road Services.

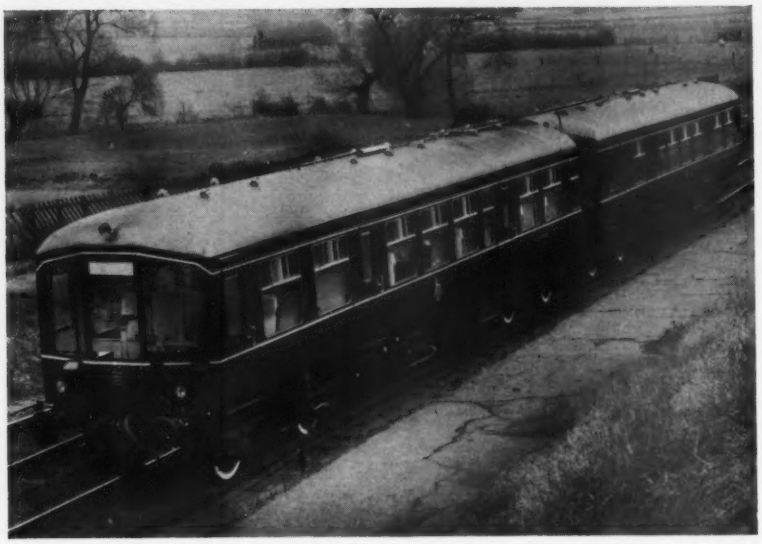
The modernisation of this supply point has also included complete replacement of the d.c. cables feeding the railway tracks and escalator circuits. These have been installed on an entirely new run via one of the disused lift shafts, which has permitted ample segregation of the cables and ready access for maintenance purposes. There is a vertical drop of 80 ft. between the upper and lower levels, and all the cables, both low tension and high tension, are of the non-bleeding type, paper insulated, pre-impregnated with Diatrine compound. They were manufactured by W. T. Glover and Co. Ltd. and installed by London Transport staff.

HOLIDAYS IN BRITAIN EXHIBITION EXTENDED.—Because of the public interest shown in the Holidays in Britain exhibition at Charing Cross Underground station, which was due to close on Friday, April 30, it has been decided to extend it for another two weeks. Well over 100,000 have visited the exhibition, which has been organised by the British Travel and Holidays Association. The exhibition, which pictures the attractions of British resorts, will now close on May 15.

XUM

Lightweight Diesel Trains for British Railways

First units of £2,000,000 programme to work interval services in West Riding in summer timetable



Two-coach diesel train for West Riding services. The leading vehicle is the composite, with first class in front, and the rear vehicle the brake third

THE first multiple-unit diesel train to be built under the British Transport Commission £2,000,000 programme for the development of lightweight diesel passenger services on British Railways was demonstrated on a trial run from Marylebone to Beaconsfield and back on April 29.

As recorded in our February 12 issue, the programme provides for the introduction of multiple-unit diesel trains in six areas:—

West Riding of Yorkshire, North Eastern Region: eight two-car units
West Cumberland, London Midland Region: 13 two-car units
Lincolnshire, Eastern Region: 13 two-car units
East Anglia, Eastern Region: 14 two-car units
Newcastle-Middlesborough, North Eastern Region
Edinburgh-Glasgow, Scottish Region

In all these areas, lightweight diesel units will operate partly in substitution for existing steam services, and partly in addition to them. The greater economy, flexibility and cleanliness of the diesel railcars on suitable selected routes is expected to enable existing services to be worked at lower cost, besides providing better and more attractive facilities which will create fresh business.

Except in the case of the proposed Edinburgh-Glasgow route, where the design will conform to the requirements of a longer-distance interurban service and will include additional amenities such as a buffet, the basis of the new type of service will be a two-car unit, one vehicle being powered by two bus-type horizontal engines of at least 125 h.p. under the floor, and the other a trailer or another motor coach as required.

Each two-car unit can be driven from either end, and can be operated either as a self-contained unit seating about 130 passengers, or alternatively can be fitted into multiple-unit trains of four, six, or eight vehicles, according to traffic requirements. This system offers the advantage of being adjustable to traffic demands up to over 500 passengers, while making for economical working when traffic is light.

The train used for the demonstration on April 29 was built at British Railways Derby Works, with power units supplied by Leyland Motors Limited. It consists of two identical two-car units, four vehicles in all. Each two-car unit comprises: (*a*) a motor composite car, 57 ft. 6 in. long over body, seating 16 first and 53 third class passengers; and (*b*) a motor third brake, also 57 ft. 6 in. long, seating 61 third class passengers. The total seating accommodation is for 130 passengers.

Accommodation and Layout

The driving compartment in each unit is divided from the passenger accommodation by large glass partitions through which most of the forward (or rearward) occupants of the bus-type seats can watch the track, signals, and, at the front, the driver's handling of the train.

The composite car has lavatory accommodation, and the motor third brake a compartment for the guard, baggage, and parcels. Passenger seating is arranged on either side of a centre gangway. The two vehicles of each unit intercommunicate through the vestibule type corridor connection similar to that obtaining in long-distance passenger stock. Two doorways on each side of each car give access to the passenger compartments, with separate doors to the driving and guard's compartments.

Extensive Use of Light Alloys

A special feature of the design is the extensive use of light alloy metal. The bodies and underframes of each car are fabricated as one unit, giving great strength with comparatively light weight; including the four 125 h.p. Leyland power units, two to each car, and 232 gal. of diesel fuel, the weight of the two cars together is 54 tons.

The combination of two powered vehicles, with an aggregate of 500 h.p., is required for the steep gradients of the West Riding lines on which this series will be used. In some areas only one motor vehicle will be needed for each two-car unit.

The unit demonstrated is geared for a normal maximum service speed of 62 m.p.h., which is fully adequate for the type of service on which it will work, in view of the rapid acceleration.

Body Construction

All framing members are of extruded sections riveted together with light-alloy rivets, and the panelling is welded by the Argon arc process to form continuous sheets between the entrance doors, and is riveted to the frame members. The floor is constructed of extrusions of special sections, and forms part of the structure. It is covered with two thicknesses of flameproof hardboard, with an overlay of linoleum. To reduce condensation, and noise, the whole of the inside structure and the underside of the floor is sprayed with asbestos.

The interior panelling is composed of flameproof hardboard, covered with P.V.C. cloth; the colour scheme is varied. The seats have frames of tubular steel which are trimmed in maroon moquette in the third class, and blue uncut moquette in the first class. Baggage racks formed of light-alloy tubes of square section are provided on both sides, running the complete length of the compartments.

A lavatory is provided in the composite car, and is adjacent to the vestibule. Primrose plastic panels are fitted and the floor is of rubber tiles.

Lighting of the passenger compartments is provided by 60-W., 24-V. lamps in standard fittings, the driving and guard's compartments being arranged on separate circuits. Current for the lighting and control circuits is supplied by alkaline batteries charged by dynamos, belt-driven from the engines.

Heating is provided by means of oil-

burning combustion heaters mounted under the framing, and supply warm air by ducting running the full length of both sides of the passenger compartments at floor level and thermostatically controlled.

The exterior of the body is finished in British Railways' engine green, relieved by yellow lines at the waist and above the windows.

Bogies and Power Units

The bogies are of British Railways' conventional design in mild steel, the main frame members being riveted together; the individual members are partly fabricated. The bolsters are fitted with spring side-control, and side friction blocks. The axles are carried on British Timken roller bearings. The two Leyland 138-b.h.p. horizontal diesel engines are generally similar to those used for powering Leyland under-floor engined, road transport vehicles. The engines are arranged symmetrically on each side of the longitudinal centre line, each engine driving the inside axle of each bogie.

Each power car is identical and has its driving controls at one end of the car. They can be coupled together indiscriminately, provided there is a driving control at each end of the train. With either two or four cars coupled together, up to eight diesel engines can be synchronised and controlled from either end. From either driving position, the driver can stop or start each engine individually, the performance of each being indicated by instruments in the driver's compartment.

Transmission

The drive from each engine is taken through a Lysholm Smith (Leyland) torque convertor to the final drive on the axle. The torque convertor is of unit construction with the engine and consists of (*a*) a double-acting clutch for connecting the engine either to the pump wheel of the torque convertor drive, or direct to the output shaft; (*b*) the hydraulic system of the torque convertor, and (*c*) the free wheels, incorporated in both convertor and direct drive, to allow the car to over-run the engine.

The clutch is of the double-acting type with a neutral position operated by a simple toggle mechanism, which in turn is operated by a double-acting air cylinder. The hydraulic portion of the torque convertor consists of a centrifugal pump in a single casing, with a three-stage hydraulic turbine which gives a maximum torque multiplication of five to one. The free wheels are of the roller type and are built into housings secured to the rear of the convertor housing.

The final drive, developed jointly by Leyland Motors Limited and Walker Bros. (Wigan) Ltd. is of the double-reduction type, giving an overall reduction of 3·58 to 1.

The controls have been developed jointly by Leyland Motors Limited and Walker Bros. (Wigan) Limited. All are electro-pneumatically operated from the two 24-V. batteries, and consist of electric switches which operate magnet valves throughout the train. Controls are conveniently grouped on the left-hand portion of the driving cab, and consist of (*a*) engine speed control (*b*) clutch control, (*c*) direction control. Engine speed is controlled by small air cylinders, four such being built into a unit and mounted adjacent to the butterfly-valve on the air manifold.

Four engine speeds are provided in addition to the normal idling speed. The dead man's device is incorporated. If the handle is released, after a five seconds delay, all engines are returned to idling speed, the clutches are automatically returned to neutral, and the brakes are automatically applied. The return of the clutches to the neutral position prevents the stalling of engines.

Clutch Positions

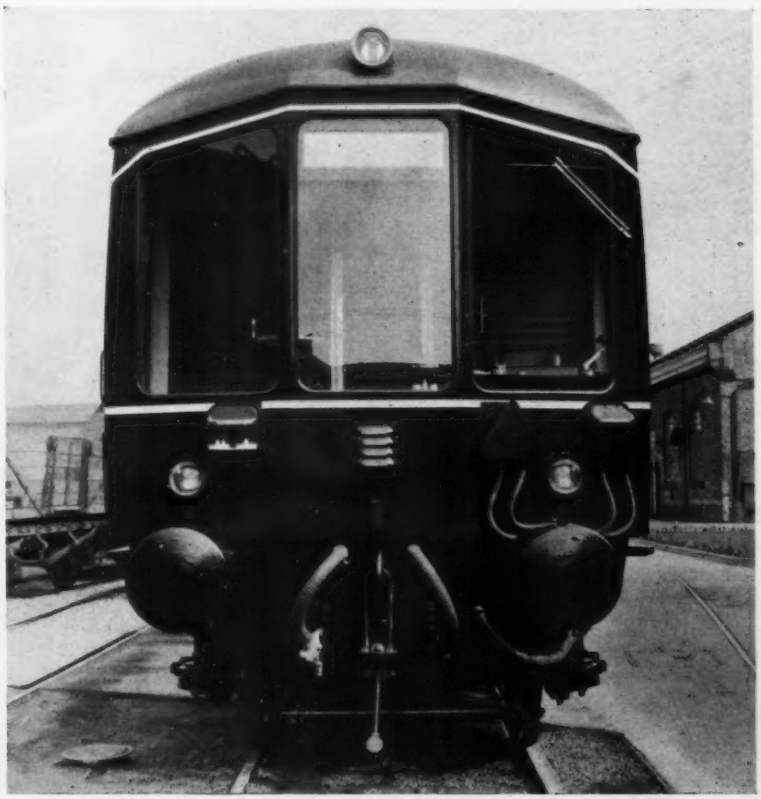
The clutch control has four positions —"handle off," "neutral," "convertor drive" and "direct drive." Only in the neutral position is it possible to start the engine or change the direction of the train. The clutch is controlled by the air cylinder built onto the torque convertor, and air is admitted through two magnet valves adjacent to each convertor. So that the speed of the train may exceed the engine speed when necessary, two over-running free wheels are incorporated in the torque convertors, one for the convertor drive and one for the direct drive. The direction control has two positions only—forward and backward. These are obtained by air-actuated pistons operating the forward and reverse sliding pinions.

Improved Yorkshire Services

After trial runs and training of crews in anticipation of the introduction of public services in Yorkshire, the new trains will go into service on introduction of the summer timetable on June 14. They will provide an improved service in the North Eastern Region between Leeds Central and Bradford Exchange, and between Leeds Central and Harrogate.

Trains of two-car diesel units will leave Leeds Central at half-hourly intervals from 8.6 a.m. to 11.6 p.m., and Bradford Exchange every half-hour from 5.35 a.m. to 10.35 p.m., subject to minor adjustments for traffic purposes. The "interval" trains will run mainly via Stanningley, with additional trips via Pudsey Greenside. Certain Bradford-Leeds services will be extended to Harrogate.

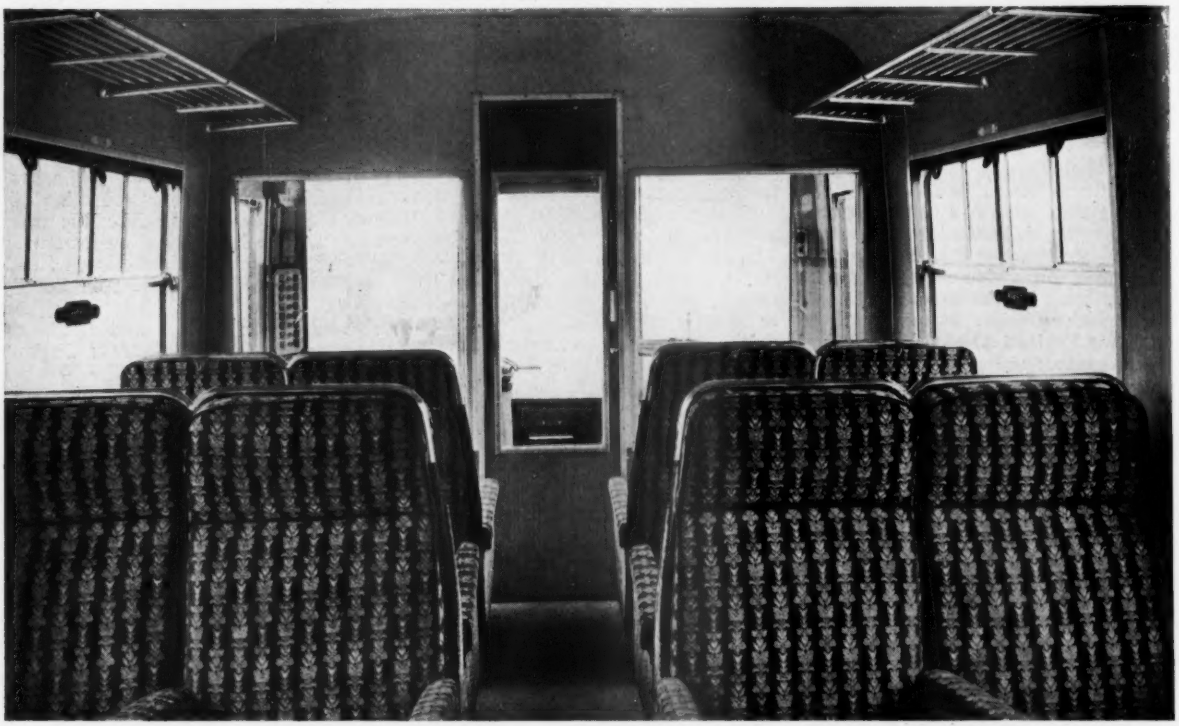
On Sundays a frequent service will be run between Bradford, Leeds, and Knaresborough.



End view showing large windows; when the blinds on the glass partition are up, passengers have an unobstructed view through the driving compartment

XUM

Lightweight Diesel Trains for British Railways



First class compartment seating 16 passengers, showing view through driving compartment

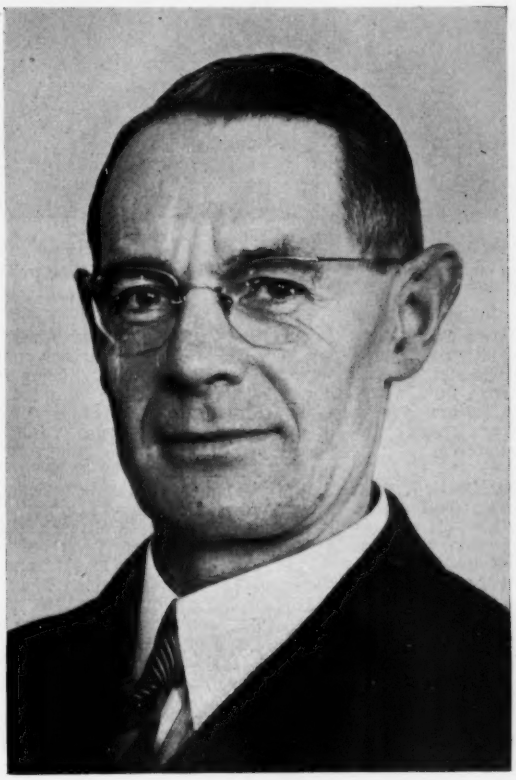
Interior of third brake, with seats facing driving compartment and glass partitions between compartments

RAILWAY NEWS SECTION

PERSONAL

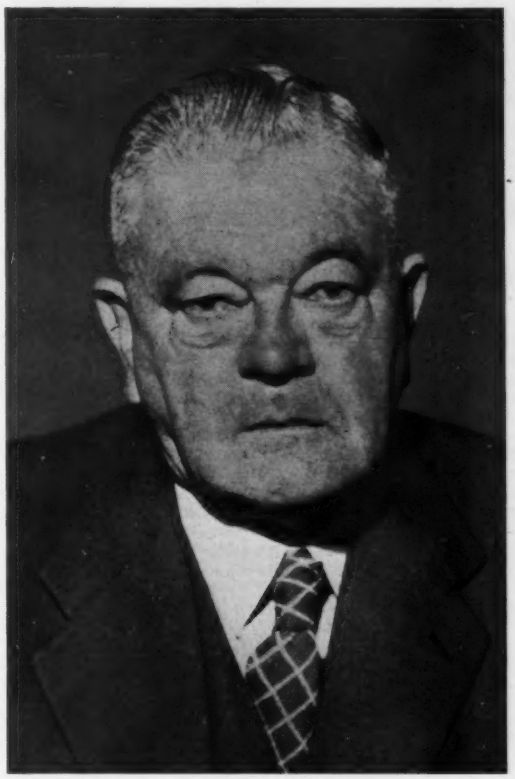
Mr. B. Arora, B.Sc., Senior Deputy General Manager, North Eastern Railway, India, has been appointed General Manager of the system.

Mr. Henry G. Boardman, Secretary of Coras Iompair Eireann, having reached retiring age, has resigned his position after 44 years railway service.



Mr. J. Holden Fraser

President, Institution of Railway Signal Engineers, 1954-55



Mr. L. C. Stewart

Comptroller of Stores, Victorian Railways, 1947-54

Mr. J. Holden Fraser, B.Sc., A.M.I.C.E., M.I.R.S.E., Chief Officer (Signal and Telecommunications), British Transport Commission, who, as recorded in our April 16 issue, has been elected President of the Institution of Railway Signal Engineers for 1954-55, joined the Stratford District Civil Engineering Department of the Great Eastern Railway in 1917. After military service in the 1914-18 war he returned to the Signal Section in 1919 and acted as Signal Engineer after the retirement of Mr. W. H. Bird. Mr. Fraser prepared an extensive scheme of colour-light suburban signalling and, on the amalgamation of the G.N., G.C., and G.E. Engineering Departments in 1924, he was appointed Indoor Assistant to the Signal Engineer (Southern Area), acting also as Outdoor Assistant for the G.E. and southern half of the G.N. sections. In 1926 he became Signal Assistant at Edinburgh and, in 1929, Chief Assistant (Signals), Scottish Area. In 1931 he was appointed Assistant Signal Engineer, N.E. Area, and, in 1947, Assistant to Engineer (Signals). On nationalisation he became Signal & Telecommunications Engineer, North Eastern Region, and was responsible for organising the Signal & Telecommunications Staff into a separate department, and for carrying out a number of important projects, including the new signalling installation at York. Mr. Fraser was appointed Chief Officer, Engineering (Signal & Telecommunications), Railway Executive headquarters, London, in 1952. He became Chief Officer (Signal & Telecommunications), British Transport Commission, in 1953.

Mr. L. C. Stewart, Comptroller of Stores, Victorian Railways (Australia), who, as recorded in our April 23 issue, retired recently after 49 years service, joined the Department as a junior clerk at Melbourne Goods in 1905. He was transferred to the Stores Branch, Head Office, seven years later. From shipping clerk he rose to be personal clerk to a former Comptroller of Stores (Mr. C. W. J. Coleman), Chief Clerk, Assistant Comptroller of Stores, and, ultimately, Comptroller, upon the retirement of Mr. H. S. Sergeant in 1947. During the last war Mr. Stewart was a member of a sub-committee appointed by the State Government to control the dispersal and storage of foodstuffs and essential requirements throughout Victoria for use in an emergency. In the immediate post-war years when Victoria experienced an acute shortage of coal for locomotive, power station, gas and industrial use, Mr. Stewart administered Government contracts for over one million tons of imported coal, valued at £10 mildion. In addition, a contract for 600,000 tons of Queensland Callide coal was let in 1951. Seventy-eight shipments were received up to the time of Mr. Stewart's retirement. He also handled the contractual side of "Operation Phoenix" (the Railways £80 million rehabilitation plan). Other important contracts administered by Mr. Stewart were for pre-cut houses and materials for hostels to accommodate railway staff recruited in the United Kingdom and Europe.

Mr. F. Orchard, Chief Clerk, Stores Branch, Victorian Railways, has been appointed Comptroller of Stores for the system.

Institution of Mechanical Engineers

The following have been elected Associate Members of the Institution :—

Messrs. P. L. Antonissen, B.Sc., A.B.O.E. Limited; C. Haywood, Laycock Engineering Limited; S. Hetherington, Dunlop Rubber Co. Ltd.; G. B. Murdoch, B.Sc., Merz & McLellan; J. S. P. Railton, Motive Power Superintendent's Office (Mechanical), North Eastern Region, British Railways, York; W. Twynham, Steam Turbine Design Department, English Electric Co. Ltd.

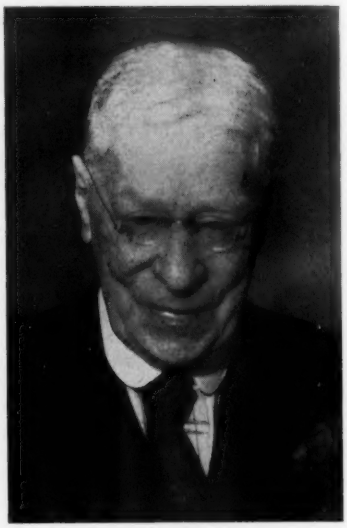
XUM

Mr. E. H. Baker

Appointed Divisional Motive Power Superintendent, Crewe, L.M. Region

Mr. D. Fenton

Appointed District Operating Superintendent, Southend District, Eastern Region



The late Mr. F. H. Graveson

Assistant to Divisional General Manager, York, L.N.E.R., 1922-35

Mr. Eric Herbert Baker, M.I.Mech.E., M.I.Loco.E., Assistant Divisional Motive Power Superintendent, Derby, London Midland Region, British Railways, who, as recorded in our April 9 issue, has been appointed Divisional Motive Power Superintendent, Crewe, commenced his career as a premium apprentice at Doncaster Works and, during this period, attended a Works Pupils' course at Sheffield University. After serving in various capacities at Gorton, Tuxford, Southend, and Liverpool he was, in 1935, made a Technical Assistant to the Locomotive Running Superintendent, Southern Area, L.N.E.R. In 1937 he became Assistant District Locomotive Superintendent, Ardsley, and in 1942 took up a similar position at Cambridge. In 1944 Mr. Baker was made Assistant to the Locomotive Running Superintendent, Eastern Section, Shenfield; in 1945 District Locomotive Superintendent, Peterborough; and, in 1946, District Locomotive Superintendent, Gorton. Two years later he was appointed as Assistant Divisional Motive Power Superintendent, Derby, from which position he now takes up his new post at Crewe. Under Mr. Baker's control are 18,150 staff and 2,675 locomotives.

Mr. D. Fenton, Assistant District Operating Superintendent, Nottingham, Eastern Region, British Railways, who, as recorded in our April 16 issue, has been appointed District Operating Superintendent, Southend District, Fenchurch Street, entered the service of the L.N.E.R. as a Traffic Apprentice in October, 1935. After a period of training in the Southern Area, he had further experience in the Passenger Manager's and Divisional General Manager's offices before being appointed Supernumerary Assistant to the District Superintendent, Cambridge, in June, 1940. In September, 1940, Mr. Fenton joined H.M. Forces and was commissioned in the Royal Artillery, being demobilised in February, 1946, with the rank of Captain (Instructor in Gunnery). After a short period as Assistant Yardmaster, Spitalfields, Mr. Fenton went to the Scottish Area, L.N.E.R., where he had both commercial and operating experience before returning to the Works Section of the Divisional General Manager's Office, Southern Area, L.N.E.R., Liverpool Street, in August, 1947. He was appointed Assistant District Operating Superintendent, Lincoln, in November, 1948, and, in May, 1950, took up the corresponding position at Manchester. He became Assistant District Operating Superintendent, Nottingham, in November, 1952.

The late Mr. F. H. Graveson, whose death on March 23, at the age of 83, was

Mr. L. B. Alexander

Appointed London Manager, Metropolitan-Cammell Carriage & Wagon Co. Ltd.

Eng. Commander H. V. Gaud

Manager, Railcar Division, Metropolitan-Cammell Carriage & Wagon Co. Ltd., 1939-54

Mr. E. J. Wilson

Appointed Manager, Railcar Division, Metropolitan-Cammell Carriage & Wagon Co. Ltd.

recorded in our April 23 issue, retired in 1935 from the position of Assistant to the Divisional General Manager, York, London & North Eastern Railway, after 40 years of service on the railway. He was best known in the railway world as a pioneer in the preparation of operating statistics and costing. Mr. Graveson, who was born at Hertford, was educated at the grammar school there, at Ackworth, and at Bootham, York. He entered the service of the North Eastern Railway in 1894, in the office of the Superintendent of the Line at York, and afterwards took up staff and statistical work. In 1902 he was transferred to the Traffic Statistics Office, being in charge of the staff section of the Superintendent's office in that year when re-organisation of the railway took place under Sir George Gibb. In 1907 he moved to the General Manager's Office, and, in 1912, to the Passenger Manager's Office, returning a year later to the General Manager's Office. During the latter part of the 1914-18 war he went on a special mission to America where he acted as Director of Statistics to the British Minister there on behalf of the Ministry of Food. In 1922 he was appointed Assistant to the Divisional General Manager and Head of the Traffic Statistics Office, being designated the single title of Assistant to the Divisional General Manager in 1934.

Mr. L. B. Alexander, who succeeded Commander H. V. Gaud as London Manager of Metropolitan-Cammell Carriage & Wagon Co. Ltd. on January 1, 1954, was educated at Eton and Trinity College, Oxford. He joined the Metropolitan-Cammell Company in 1930 and was a pupil at Saltley, Midland, Old Park, Oldbury and Nottingham Works. In 1932 he was transferred to the new Bus Sales Organisation — Metropolitan - Cammell - Weymann Limited. In 1934 he returned to Metropolitan-Cammell and, from 1936 to 1937, he represented the company in Brazil when the first sixty 3-car electric train units were supplied for the new suburban electrification in Rio de Janeiro. Since 1937 he has been Assistant London Manager with the interval of the war when, from 1939 to 1945, he served in a territorial unit of the anti-aircraft in France and in the United Kingdom, and later with the Director-General of Artillery in the Ministry of Supply. Mr. Alexander is 46.

Engineer Commander H. V. Gaud, R.N. (Retd.), M.I.Mech.E., M.I.Loco.E., who, as recorded in our April 23 issue, has retired from the position of Manager of the Railcar Division of Metropolitan-Cammell Carriage & Wagon Co. Ltd., while remaining on the board of Metropolitan Railcars (Ganz Patents) Limited in an advisory capacity, was born at Tavistock on June 4, 1882. He was educated at Kelly College, Tavistock, and entered the Royal Naval Engineering College, Devonport, in 1899. Commander Gaud served with the Royal Navy until 1922, when he retired and joined Sentinel Waggon Works (1920) Limited to run its Railcar Department, subsequently becoming Joint Managing Director of that company. In 1939 he left Sentinel to become London Manager of the Metropolitan-Cammell Carriage & Wagon Co. Ltd. At the same time he became a Director and General Manager of Metropolitan Railcars (Ganz Patents) Limited.

Mr. Edward John Wilson, A.M.I.Mech.E., M.I.Loco.E., who, as recorded in our April 23 issue, has been appointed Manager of the Railcar Division of Metropolitan-Cammell Carriage & Wagon Co. Ltd., and who has also joined the board of Metropolitan Railcars (Ganz Patents) Limited, was born at Aberdeen on August 31, 1910. He was educated at St. George's College, Buenos Aires, Strathallan School, Perthshire, and the University of Glasgow, where he obtained the degree of B.Sc. in mechanical engineering. During 1935-36, Mr. Wilson was engaged on the construction of diesel mechanical railcars for the Entre Rios Railway, when he served as a pupil in the works of the engine, transmission, and carriage builders concerned. In 1937 he proceeded with completed railcars to the Argentine, where he took up the position of Diesel-Assistant to the Chief Mechanical Engineer of the Entre Rios Railway, with responsibility for putting trains into service, as well as organising the department set up in the shops for their maintenance and repair. In 1941, he was appointed Assistant Workshops Manager of the Entre Rios Railway, in this capacity being engaged on general locomotive, carriage and wagon repair work, while retaining charge of the railcar repair department. He left the Entre Rios Railway in 1947, subsequently becoming Chief Engineer with the firm of Alpargatas, one of the largest industrial concerns in Buenos Aires. He left the Argentine to take up his new appointment with Metropolitan-Cammell Carriage & Wagon Co. Ltd. in October, 1953.

Mr. E. J. M. Matheson, Assistant District Engineer, Sheffield, Eastern Region, British Railways, has been appointed District Engineer, Glasgow (North), Scottish Region.

Mr. W. N. Pellow, Motive Power Superintendent, Western Region, British Railways, retired on May 5, on reaching the age of 65, after more than 50 years of railway service.

Mr. Fay N. McKenzie has been appointed Passenger Traffic Manager for the Western Region of Canadian National Railways. He succeeds Mr. W. G. Connolly, who retires on May 31.

Mr. T. S. Lascelles, Managing Director of W. R. Sykes Interlocking Signal Co. Ltd., has retired, and is succeeded by Mr. F. J. Sykes, Director & General Manager. Mr. N. G. Kershaw, Assistant General Manager of the company, becomes General Manager.

Mr. Fleetwood C. Pritchard, Chairman of F. C. Pritchard, Wood & Partners Limited, advertising agents, has been appointed Honorary Advisor to the Minister of Transport on public relations with regard to service transport. Mr. Pritchard was Director of Public Relations in the Ministry of War Transport during the recent war.

Mr. John F. Alcock, M.A., M.I.Mech.E., M.I.Loco.E., Chairman and Managing Director of the Hunslet Engine Co. Ltd., has been re-elected President of the Locomotive Manufacturers' Association for 1954-55.

We regret to record the death on May 1, at the age of 89, of the Rt. Hon. James MacMahon, P.C., a Director of the Dublin & South Eastern and Fishguard & Rosslare Railway Companies until the 1925 amalgamation, when he joined the board of the newly-formed Great Southern Railways Company. He remained a Director of the undertaking until January, 1945, when Coras Iompair Eireann was formed by the merger of the G.S.R. and of the Dublin United Transport Company. Mr. MacMahon had then been Chairman for several years of the latter company, and was also Vice-Chairman of the Grand Canal Company, which later, in its turn, was joined to C.I.E. He retired from his railway interests at the age of 80.

We regret to record the death, on April 29, at the age of 35, of Mr. Phillip T. Ward, a Director of Thos. W. Ward Ltd.

Mr. James D. Vaughan has been appointed a Vice-President of the American Locomotive Company, and Mr. Malcolm C. Downs, Comptroller.

Mr. B. Thornton has resigned his directorship of the Wellman Smith Owen Engineering Corporation for reasons of ill-health.

Mr. Alfred E. Neate, formerly Director-General, Machine Tools, Ministry of Supply, has been elected a Director of Wickman Limited.

We regret to record the death, at the age of 68, of Mr. Hubert H. P. Trist, Founder, late Chairman, and Joint Managing Director of Transport Brakes Limited.

Mr. M. M. Hallett has been appointed Director of Research to three companies of the Sheepbridge Group: Sheepbridge Stokes Limited, Sheepbridge Equipment Limited, and Sheepbridge Steel Castings Limited.

Transport Users Consultative Committee

North Western Area

The following have been appointed members of the Committee for the North Western Area until March 31, 1957:—

Chairman: Mr. W. W. F. Shepherd.

Members: (Representing Agriculture): Mr. J. Heyes, M.B.E.. (Representing Industry): Messrs. W. D. Broadbent, M.Inst.T., J. T. Moss, L. Highton, J.P., T. J. Sales. (Representing Commerce): Messrs. H. W. Smail, F. Abbotts. (Representing Shipping): Mr. A. N. Hunt. (Representing Labour): Miss L. Hodson, M.B.E., J.P., Mr. M. J. Newton. (Representing Local Authorities): Councillor D. D. Williams, Councillor W. Walsh. (Representing the British Transport Commission): Messrs. T. W. Polding, W. E. Macve.

Secretary: Mr. C. Dove.

The office of the Committee is at 16, Peter Street, Manchester, 2.

East Midland Area

The following have been appointed members of the Committee for the East Midland Area until March 31, 1957:—

Chairman: Professor R. Peers, O.B.E., M.C., D.Litt., J.P.

Members: (Representing Agriculture): Colonel R. Vaughan-Williams, Mr. H. J. Wild, B.Sc., A.C.G.I. (Representing Industry): Messrs. C. F. Berridge, J. H. Criddle, A.M.Inst.T., A.M.I.T.A., W. E. Fowler. (Representing Commerce): Mr. L. Walker, Alderman R. Arbon. (Representing Shipping): Mr. W. F. Knowles. (Representing Labour): Messrs. G. E. Dearing, M.B.E., J.P., B. Sharpe. (Representing Local Authorities): Alderman A. L. Chown, Councillor S. W. Bridges. (Representing the British Transport Commission): Sir H. Reginald Kerr, K.B.E., C.B., M.C., M.Inst.T., Mr. W. B. Carter, J.P., M.Inst.T.

Secretary: Mr. S. W. Walton.

The office of the Committee is at 5, Victoria Street, Derby.

XUM

Ministry of Transport Accident Report

Collapse in Clifton Hall Tunnel, April 28, 1953: British Railways, London Midland Region

Brigadier C. A. Langley, assisted by Colonel W. P. Reed, both Inspecting Officers of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at 5.35 a.m. on April 28, 1953, when part of the roof of Clifton Hall tunnel, on the double line branch of the London Midland Region connecting Patricroft with Molyneux Junction, fell in and undermined the ground above. The contents of an old unknown constructional shaft, which had been filled in, poured into the tunnel, forming a crater, and a pair of semi-detached houses collapsed and the end wall of a third fell outwards. Five occupants of the collapsed houses lost their lives, but two others were rescued from the third suffering only from minor injuries and shock. The collapse was witnessed by a police inspector living opposite who at once summoned assistance which speedily arrived. A stationmaster a few doors away also saw the trouble, helped to release people, and informed the Chief Controller, Manchester.

Building of the Tunnel

The line was opened in 1850 to serve collieries. A few passenger trains used the route before the 1939 war, since which it has been restricted to goods traffic. It was closed during that war and reopened for a limited service in October, 1947. The ground above was originally pasture land crossed by two roads but has been gradually developed and now forms part of Swinton. The street in which the collapsed houses stood crosses the tunnel diagonally. The line is straight and the tunnel, 1,298 yd. long without a ventilating shaft, is lined with brick resting on a brick invert, with greatest width of 24 ft. 9 in. Height from invert to top of arch is 22 ft. 3 in. Unfortunately all records and drawings in the District Engineer's office had been destroyed, some in an air raid, others in a fire and that officer possessed no information about it. There was some, however, in the archives of the Ministry of Transport, while old civil engineering plans and a report on defects in the tunnel were found in the Railway Mining Engineer's Office at Derby after the accident.

The tunnel was inspected on December 29, 1849, by Captain G. Wynne, who formed a good impression of its construction and the type of location through which it passed. Its appearance gave every reason to suppose it to have been properly constructed. It is still wet in places today and has been patched many times in the last 100 years. Some large sections have been rebuilt. Eight shafts, numbered 1A, 1, 2, 3, 4, 5, 5A and 6 (shown on the drawings accompanying the report) were sunk and filled in on completion of the tunnel and as their positions were not marked on the sides all traces were lost. (The Inspecting Officers found it impossible to tell where the old openings had been. Information about them had to be got from an old progress plan in the Civil Engineer's Office.) Exploratory work was carried out to find them. Ground below collapsed houses was excavated to a depth of 32 ft. before the lining of shaft No. 3 was uncovered, where traces were found of timber curbs used in the original construction. The positions of some other shafts were located but of others not.

The coal measures below lie, at the shallowest, 1,500 ft. down. There has been some settlement in the course of time amounting in the past 22 years to a maximum of 5 ft. 4½ in. at the Patricroft portal but in No. 3 shaft, in the same time it has been only 11 in. gradually decreasing and disappearing 384 yd. from there inside the tunnel. No settlement has occurred since March 9, 1953. Coal was first worked under the Molyneux Junction end and although no subsidence was recorded, additional support was given to the roof by steel ribs of old rails at 5 ft. centres in 1901 over 617 yd. from that end. In 1926 similar ribs were put in for 500 yd. from the Patricroft end when coal was being worked below, leaving 282 yd. in the centre without any, including sections under shafts 3 and 4. The ribs were purely a precaution against mining subsidence, so slow and regular that the failure cannot be attributed to it.

Course of Events and Evidence

The first signs of trouble were noticed by a ganger 15 days before the accident, when he found rubble on the track and brickwork peeling off badly at one place in the roof. He had not seen such falls in his 12 years in the tunnel. He stopped traffic and informed his inspector. Prompt action was taken. A District Works Inspector and Permanent Way Inspector went into the tunnel and reported to the District Engineer. The Chief Works Inspector and Assistant District Engineer (his chief being away that day) made an examination. The latter decided to keep the tunnel closed pending repairs. The next day, with his chief and several staff, he made a detailed examination from an inspection wagon. Two blocks of brickwork had fallen leaving 3 ft. 6 in. gaps, about 9 in. deep by 10 in. wide, in the face ring and there were signs of butt joints across the crown of the arch and the ends of the damaged section with an area of patched brickwork at one end. The crown between the butt joints was 2 in. lower than the general level of the tunnel. The gaps revealed partly rotted timber, about 9 in. by 6 in., with more brickwork behind. It would seem that behind the face ring of each arch there was a piece 11 in. to 12 ft. long, lying longitudinally in the second ring and extending from one butt joint to another.

It was decided to strengthen the place with rail ribs of improved design, curved on their major and not minor axis, affording greater resistance to buckling, to rest on longitudinal rails supported by "putlogs," short rail lengths cemented into the tunnel ring. Profiles were taken but drawings could not be finished until April 20 when a works order was placed. By then the "putlogs" were in position. Difficulty was experienced in bending the rails and overtime had to be worked. Meanwhile measurements were being taken to see whether there was any movement of the defective brickwork. Falling of the arch and cracks showing after April 21 caused the Assistant District Engineer on April 23 to make another examination. He decided to put in timber props until the rail ribs arrived, intending to place four underneath the up side gaps, another four to support the crown on the down side. A sketch was made and an order placed. This officer and his chief visited the site later that day and noted that the gap between the face and centre rings had appreciably increased. It was felt the centre ring should be wedged and a bridge examiner was instructed accordingly. Actually he inserted the wedge in the bottom row of brickwork but no further movement occurred. Hearing that three sets of rail centres would be ready by the week-end the District Engineer decided to drop the plan for emergency propping and arrange for the rings to be placed in position on the Sunday, April 26, intending they should go under the centre of the damaged arch, at 3-ft. spacing. Unfortunately, from lack of experience, the men could not get the first one ready before 4.0 p.m. when, as the wagon was pushed into the tunnel, it began bearing against the sides and roof before reaching the correct spot, indicating that it would not go under the defective brickwork. After much trouble it was put 12 ft. from its intended place. In taking profiles a few feet clear of the damaged brickwork variations in the shape of the lining had not been noticed and not enough settlement allowance made. The ring was in consequence a little too large.

It was seen to be impracticable to flame cut and alter on site. It was late and the work had to be stopped. Fresh profiles were taken the following morning and arrangements made to alter the other rings, expected to be ready by April 29. By then it was too late.

After the Collapse

The District Engineer found the tunnel completely blocked with sand and loose brickwork still flowing from the hole in the roof 40 min. after the accident. He arranged for the tunnel on either side to be packed solid with ashes and stout timber bulkheads to be erected. This was done by May 6; since then the bulkheads have been strengthened. When excavating, as before mentioned, the whole area was probed for voids likely to cause further settlement but none was found. A check of the volume of the cavity on the surface and quantity of sand which fell into the tunnel gave assurance that no cavities now exist and the whole area has been filled in. The shaft was found to have been filled throughout its length with wet sand and the ground around made up of similar material.

The report found at Derby dated February 10, 1913, referred to temporary shafts and said none now existed. It also said that the tunnel was examined annually and that for many years portions had been "reported to be in an unsatisfactory condition." It referred to defects appearing in 1912 and a decision to rebuild certain lengths practically covering the site of the shafts where iron rib centres were put in in the April, when the old arch and side walls were removed and the length rebuilt in blue brickwork in cement. Certain old partially decayed timbers were found, no doubt forming the base of one of the old shafts. The report also gave details of the rebuilding by specially expert tunnel gangs. No drawings mentioned in it could be found but research suggested that the shafts had been supported during construction by timber shoring, replaced by a wooden framework built into the brickwork when the shaft section of the tunnel was lined. The decayed timber found at

No. 3 shaft probably was a longitudinal member of such a framework. As others may have been left additional very heavy reinforcements have been put in under No. 4 shaft, where there was none, and at others, where the reinforcement was over 50 years old the brick lining has been further strengthened by pairs of improved type ribs between the existing rails. The lining under shafts 1 and 2, was rebuilt in 1912 and old timbers removed; rail ribs also have been put in here and the tunnel appears amply strong enough. Where ribs were put in 25 and 50 years ago under other shafts special attention is being paid to inspection of the lining; no further trouble is anticipated.

Inspection and Maintenance

The Assistant Chief Works Inspector, responsible for annual inspection, first undertook this in 1947, keeping detailed notes of the lining in each 50-ft. section, showing the brickwork to need attention in many places. In 1948 he reported perished brickwork and cracking in the arch close to where No. 3 shaft opening proved to be. Similar reports were made up to 1952, and the inspector recommended annually that the un-reinforced sections should be strengthened with ribs. The Divisional Engineer, however, decided that ribs were not necessary, as there was little mining settlement and brickwork was not in bad condition. Proposals for patching portions and relining in other places were included in the 1951-52 programme but work was postponed as conditions did not appear to be deteriorating. Funds for repairs were included in the current budget but the District Engineer did not consider the work immediately necessary. He had difficulty in getting skilled tunnel men and singling or closing of the line was under consideration.

Inspecting Officer's Conclusions

This failure was due to an inherent weakness in the construction of the tunnel, which was wet in places. No doubt, as Captain Wynne stated, considerable difficulty was experienced in its construction, especially when conditions of work and equipment in those days are taken into account. It seems reasonable to assume that when the shaft was finally filled in the longitudinal timber of the supporting shaft frame was left in the arch ring and in the 100 years decayed so much that lines of cleavage were created in the arch where it carried the whole weight of the 2 tons of wet sand in the shaft in addition to withstanding the stresses from tunnelling through unstable ground. Although most of the movement reported by the Bridge Examiner probably was in the face ring unstable.

The pressure on the rotted timbers it seems likely that the whole arch was would increase progressively until they finally collapsed. Then the plug of brickwork no longer could withstand the pressure of the load above. Once it fell out there was nothing to prevent the shaft contents from dropping precipitously. Those concerned were alive to the need for prompt action but none knew of the shaft and did not appreciate the very dangerous condition set up when the initial brickwork fell, or they certainly would have taken much more urgent steps.

The proposed repair plan was sound and arch movement might have been arrested had the three rings been placed in position, as attempted. It is unfortunate that the one made was too large. Timber props would have been easier to place but it is by no means certain that that would have averted the accident. They would have been replaced by the rail rings and the unstable arch might have fallen during the delicate and difficult operation. The brick lining is poor in places and repairs will be needed if the tunnel is to be reopened, but there was nothing in its appearance suggesting imminent danger of collapse, which occurred only because of the unknown shaft.

Remarks and Recommendations

Brigadier Langley is satisfied that the protective works erected as described have provided against any future trouble and has been assured that steps will be taken to preserve ground stability over the tunnel even if it is abandoned. Loss of records contributed materially to the accident, showing the dangers of lack of vital knowledge. Maintenance staffs should know of old shafts and other sources of weakness. In many cases there are only the original construction drawings, liable to be overlooked amid the numbers to be preserved today.

In this instance they were burnt by accident and it is recommended that all tunnel records be reviewed and special features brought to the notice of maintenance and examining staff. Positions of disused shafts should be permanently marked in tunnels, to be particularly watched. This is being done in the London Midland Region and should be elsewhere.

(The report contains drawings covering all the technical details to which reference is made.)

Signal Equipment School Opened at Edinburgh

Mr. J. C. L. Train, member of the British Transport Commission, accompanied by Mr. T. F. Cameron, Chief Regional Manager, British Railways, Scottish Region, on April 26 opened a school in Edinburgh for theoretical and practical instruction in the installation and maintenance of all forms of electrical and mechanical signalling equipment which are in use on British Railways.

The equipment of the school, which is at 9, Castle Terrace, Edinburgh, will ultimately consist of all types of mechanisms used in ensuring the safe working of the railway, and practical training will be given on a 60-ft. model railway layout in which the many variations of signalling apparatus in daily use throughout the Scottish Region will be incorporated.

From time to time, as new forms of equipment are introduced its demonstration under practical conditions will be arranged.

Courses of Instruction

In the initial stages groups of 12 students from all parts of Scotland are undergoing a course of instruction lasting three weeks which is designed to assist staff in qualifying for linesmen's and assistant linesmen's positions in the department of the Signal & Telecommunications Engineer. Later in the year advanced courses of instruction for other groups in the same department will be held, and opportunity will also be available for training in telecommunications equipment installation and maintenance.

The equipment and training syllabus are under the supervision of Mr. W. Bryson, Signal & Telecommunications Engineer, Scottish Region.

Future of British Railways

There was still a big future for railways, Mr. J. C. L. Train said in the course of his speech. Today travelling was more popular. New ideas were being introduced, and the railways had been decentralised.

Mr. T. F. Cameron said that railway work was becoming more complicated in every department, and certainly in signalling. Originally, signalling had started as a fairly simple system. Now it had developed to include all sorts of electrical devices.

Mr. J. C. L. Train and officers of the Scottish Region at the new training school at Edinburgh; behind the student are Mr. T. F. Cameron, Mr. J. McCreadie, Operating Superintendent, and Mr. W. Bryson

XUM

Institute of Materials Handling National Convention

The first national Convention organised by the Institute of Materials Handling, took place under the Chairmanship of Mr. A. Fraser Much, Honorary Treasurer of the Institute, at the Central Ordnance Depot, Didcot, on April 29. The theme of the convention was industrial trucks and methods, and the programme included demonstrations of improved stores handling and of specialised ancillary equipment for use with industrial trucks. These demonstrations were arranged and directed by I.T.D. Limited, and Lansing Bagnall Limited.

Two papers were read. The first, entitled "Operator Selection and Training," was presented by Mr. A. C. Cooper, and the second, on preventive maintenance, was given by Mr. A. R. E. Arnot.

After the final demonstration, a panel of industrial truck manufacturers was available to answer questions put during an "open forum" session.

Delegates to the Convention included representatives of the British Transport Commission, besides Members of The Institute of Materials Handling and their guests.

The Institute of Materials Handling, which is affiliated with the American Material Handling Society, Inc., U.S.A., hopes to organise more of these Conventions and demonstrations in the near future.

Retirement of Mr. Hubert Robyn

At a ceremony in Brussels on April 27, the Board of the Société Belgo-Anglaise des Ferry-Boats bade *au revoir* to the Managing Director, Mr. Hubert Robyn, who retired from the office he had held for over 30 years. At luncheon, the Chairman, Mr. Osterreith, referred to the part Mr. Robyn had played in the development of the Harwich/Zeebrugge train ferry service from its inception in 1922 until the present day. Largely through the efforts of Mr. Robyn negotiations were concluded with the former G.E.R. and later the L.N.E.R. on the one hand and the Belgian and other Continental Administrations on the other, whereby railway wagons of perishables and general merchandise could travel between Great Britain and the Continent. In laying down the burden of office, Mr. Osterrieth said, Mr. Robyn could know that the company within the past month had beaten its own previous traffic records.

Tributes to Mr. Robyn were then paid by Mr. G. Claeys, Chairman of the Board of Directors, Belgian National Railways, and Mr. L. H. K. Neil, Continental Traffic Manager, British Railways, Eastern and North Eastern Regions, and Vice-Chairman of the Anglo-Belgian Ferry Company. The Compagnie des Installations Maritimes de Bruges was represented by its Chairman, Mr. Pierre Van Damme, who presented Mr. Robyn with a silver tray embossed with a photogravure of one of the ferryboats. Mr. Robyn, who had earlier in the day been the recipient of the Belgian Order of Officer de l'Ordre de la Couronne and of the Italian Order Commandante dell'Ordine al merito della Repubblica Italiana, expressed his thanks, and hoped that in his capacity as Adviser to the Board he would continue to advance the interests of the company. Other British Railways guests included:—

Messrs. T. R. Hawkes, Accountant, Eastern and North Eastern Regions, and a Director of the Anglo-Belgian Ferry Company; C. G. G. Dandridge, Commercial Superintendent, Eastern Region; E. W. Rostern, Operating Superintendent, Eastern and North Eastern Regions; and Captain Davis, O.B.E., Manager (Shipping Services), Eastern Region

Longest Prestressed Concrete Bridge in Germany

As described in our October 30, 1953, issue, an important privately-owned railway has been built near Cologne to transport lignite and spoil from the mines in the area. This double-track standard-gauge railway, designed for heavy loads, crosses the Cologne-Aachen main line at a point where the latter passes through the Horrem Tunnel. This tunnel is in a poor condition and is due to be replaced by a deep cutting. It was therefore decided to anticipate this scheme and to carry the lignite railway across the tunnel line on a bridge of such dimensions that the projected opening-up of the tunnel could later be carried out without difficulty. In addition, as the bridge must cross the Cologne-Aachen main road which here runs parallel to the main line railway, it was necessary to construct a bridge of considerable dimensions, on the piers which had to be founded so deep below the present ground level that the foundations would not be affected by the proposed removal of the tunnel cover.

The specifications provided for a three-hinged arch bridge or a three-span continuous girder bridge, both of prestressed concrete, but tenderers were welcome to propose other solutions. The choice fell on an unorthodox design, a five-times statically indeterminate frame with inclined supports, built in prestressed concrete. This design avoided the main drawback of the three-hinged arch, namely the considerable horizontal thrust.

The bridge proper has an overall length of 145 m. and is continued by a 25 m. long girder bridge spanning the road. Each of the two tracks has a separate structure, apart from the common foundations. The frame supports form an angle of 60 deg. with the horizontal and are embedded in their foundations at points 86·8 m. apart. The outer parts of the bridge structure rest on abutment supports which can be adjusted to allow for settlements of the frame.

For the construction of the frame foundations, it was necessary to excavate inclined pits of 15 and 18 m. deep, respectively and in the shape of wells lined with concrete rings.

Work began in January, 1953. Most of the mechanical handling was carried out by a tower crane ranging over almost the whole site. Water had to be brought to the site in containers. By December, 1953, the bridge for one of the tracks was completed, and work on that for the second track was well advanced.

Bagnall Locomotives in Ceylon

The Royal train on the Ceylon Government Railway hauled (left) by two 4-8-0 locomotives built by W. G. Bagnall Limited, and (right) by diesel-electric locomotives built by Brush Bagnall Traction Limited

Staff & Labour Matters

T.U.C. and Wages Arbitration

The T.U.C. has rejected the proposal of the engineering courts of inquiry that an impartial body be set up to inquire into the economic problems affecting wage claims. It is also opposed to the suggestion that all industries should provide in their collective agreements for disputes to be referred to arbitration.

At a meeting of the National Joint Advisory Council on April 28, the British Employers' Confederation and the nationalised industries indicated their willingness to co-operate in these matters.

Engineers' Wage Claim

Fresh demands for improved rates of pay for engineering workers were discussed this week at the annual meeting of the national committee of the Amalgamated Engineering Union.

Among the proposals which have been tabled are demands for a minimum wage of £8 a week for unskilled workers and £9 10s. for skilled, there is also a proposal for an all-round increase of 15 per cent in rates of pay. Only a month ago as a result of negotiations conducted by the C.S.E.U., increases were secured amounting to 8s. 6d. a week for skilled engineers, 7s. 6d. for semi-skilled men, and 6s. 6d. for labourers.

The question of relationship between the A.E.U. and the C.S.E.U. will also be considered, as it is felt in some quarters that the interests of its members will be served best if the A.E.U. disaffiliates from the confederation.

Parliamentary Notes

Transport Charges Bill

Mr. Hugh Molson (Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation) in the House of Commons on April 28 moving the second reading of the Transport Charges, etc. (Miscellaneous Provisions) Bill, said the Government wished to repeal all provisions of private Acts of Parliament which restricted fares or fare stages and give to the licensing authorities the sole jurisdiction in that matter. That was done by Clauses 1 to 14.

On the other Clauses Mr. Molson said that in the Transport Acts of 1947 and 1953 full provision was made for future charges on the B.T.C. railways and inland waterways. The procedure was for schemes to be prepared by the Commission and submitted to the Transport Tribunal. Clause 3 applied the same charges schemes to the independent railways and inland waterways, and Clause 4 provided, in terms, that those schemes might at a later date be amended.

As to Clause 5, that one of the great reforms of the 1953 Act was that the railways were freed from the statutory provisions relating to equality of charges, undue preference, and so on. Clause 5 extended a similar freedom, subject to the same restrictions, to the independent railway and inland waterways undertakings. Clause 6 established a general procedure for the revision of charges made by statutory independent undertakers of special kinds, such as the harbours, ferries, bridges, and so on.

Referring to Clause 11, Mr. Molson said that when the railways were derated in 1929 to the extent of 75 per cent it was the intention of Parliament that they should pass on that relief to certain kinds of traffic, particularly coal, milk, and livestock, by which British industry and agriculture would obtain a measure of relief. The B.T.C. had been freed from the obligation to pass on the benefit in respect of its undertakings as from January 1, 1951. It was only fair that the same terms should now be accorded to the independent railway companies and canals.

"Independent" Railway Undertaking

Mr. Geoffrey Wilson (Truro—C.) asked what was an independent statutory railway undertaking. He did not think the Mumbles Railway was affected by this Bill at all. He doubted whether it was an independent railway within the meaning of Clause (3)(1) of the Bill. As far as he could recollect it came into being by reason of a series of private transactions and not a statute. He wondered whether the effect of the clauses in the Bill could be looked at and the House told what they applied to.

After a further discussion, Mr. Alan Lennox-Boyd (Minister of Transport) said that when the Bill came before a Committee he would be very ready to explain in greater detail any outstanding points. Clause 13 stated that "independent" in that connection "meant not forming part of the undertaking of the Commission."

The Bill was read a second time, and committed to a standing committee.

Questions in Parliament

Tax on Heavy Fuel Oils

In the House of Lords on April 28 Lord Teynham asked whether the Government's attention had been drawn to the present position with regard to the tax on heavy hydrocarbon fuel bills, whereby road transport users of this fuel incurred a duty of 2s. 6d. a gallon, while the same fuel when used by their competitors, the B.T.C., for railway traction, which was growing in importance, was entirely exempt from duty.

The Earl of Selkirk (Paymaster General) replied that the Government knew that the B.T.C. had recently announced plans to extend the use of trains running on diesel fuel. They did not, however, regard those proposals as likely to cause damage to road transport interests such as might necessitate reconsideration of the existing fiscal position. The present position with regard to tax on heavy hydrocarbon fuels had existed since 1935. At that time diesel engines were beginning to be used in large numbers on the road, and serious inroads were being made on the revenue from light hydrocarbon oils. Accordingly it was found necessary to impose a duty on the heavy oils used in road transport on the same basis as light oils. That position had continued.

WESTINGHOUSE PLATING DEMONSTRATION AT B.I.F.—On its stand at the Castle Bromwich section of the British Industries Fair the Westinghouse Brake & Signal Co. Ltd. is demonstrating the Dalic method of plating articles without dismantling them for immersion in a plating bath. This system can be used to reclaim articles which have become worn or over-machined, by building up the surface again, and can also be used for protective, plating or for decorative work. Among the company's exhibits are various types of Westalite rectifier, many of which are now available in smaller cases, including a new range of battery chargers.

Contracts & Tenders

British Railways, London Midland Region, have placed the undermentioned contracts:—

W. H. Heywood & Co. Ltd., Huddersfield, renewal of roof coverings with patent glazing at Dukinfield Carriage & Wagon Works

Leonard Fairclough Limited: claydigging and drainage on the Woodford to Banbury branch, former G.C.R.

Arnold Sharrocks Limited, Spotland Bridge, Rochdale: painting of Reddish electric locomotive depot

British Railways, North Eastern Region, have placed the undermentioned contracts:

Sir Robert MacAlpine & Sons (Newcastle-upon-Tyne) Ltd.: reconstruction of roof at Middlesbrough Passenger Station

Alfred Herbert Limited: one grinder and four milling machines, Shildon Wagon Works

Charles Churchill & Co. Ltd.: one broaching and three milling machines, Shildon Wagon Works

Tenders are invited by the High Commissioner for India for 90-lb. and 50-lb. rails. Full details appear under Official Notices on page 535.

The United Kingdom Trade Commissioner at Karachi has reported that the closing date of the call for tenders issued by the Director-General (Railways), Ministry of Communications (Railway Division), Government of Pakistan, for broad gauge bogie wagons, details of which were given in our issue of March 12, has been postponed until May 19. All inquiries by telephone should be made to Chancery 4411, Extension 738 or 771.

The Director-General of Supplies & Disposals, New Delhi, is inviting tenders for supply of 744 EBI cylinder arm (MG) to I.R.S. drawing No. WA.856 alt. 4 and to I.R.S. Specification No. M-3/49.

Tenders are to be submitted to the Director-General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16206-E/11 up to 10 a.m. on May 12.

Forms of tenders are only available for purchase in India from the Deputy Director-General (Supplies), Directorate-General of Supplies & Disposals, New Delhi; the Director of Supplies & Disposals, Bombay or Calcutta; or the Deputy Director of Supplies & Disposals, Madras.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form of by telegram so long as all essential particulars are given and provided they simultaneously apply for the tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the above address on application to the "CDN" Branch and drawings can be seen at the offices of Hodges, Bennett & Company, 59/60, Petty France, Westminster, London, S.W.1, from whom copies may be obtained if required at a fixed price per sheet.

B.E.T. OMNIBUS SERVICES LIMITED.—A final ordinary dividend of 7 per cent, free of tax, is recommended by the directors of B.E.T. Omnibus Services Limited for the year ended March 31 last. This makes 12 per cent, free of tax, for the year which is the same as in the previous year.

Notes and News

Vacancies for Assistant Civil Engineers.—Applications are invited from persons desiring to join the service of the Commissioner for Railways, Brisbane, Queensland, Australia, for the posts of assistant civil engineers (four required). See Official Notices on page 535.

Works Manager Required.—A works manager is required for a rolling stock builders abroad. Previous experience in the manufacture of steel railway vehicles is desirable, although not essential, but applicants should have previously held a managerial appointment. See Official Notices on page 535.

Arrangements for the Cup Final.—Wembley Stadium Station was opened specially by British Railways, Western Region, for the F.A. Cup Final between Preston North End and West Bromwich Albion on Saturday, May 1. Beginning at 12.10 p.m., a special service of non-stop trains left Marylebone Station, Western Region, at frequent intervals until 2.44 p.m., arriving at the Stadium Station 14 min. later. For the return, non-stop trains left the Stadium Station at frequent intervals between 4.42 and 6.15 p.m.

Holman Bros. Exhibits at B.I.F.—Among the compressed-air equipment exhibited at the British Industries Fair, Olympia, W.14, by Holman Bros. Ltd. is the Dustductor pneumatic chipping hammer, the Dustductor pneumatic grinder, and the ATH8D portable air compressor. The Dustductor chipping hammer has been developed after considerable research, and design is such that immediately below the air inlet a connection is provided for a light suction hose. An internal port links this outlet with the dust tube which passes through the centre of the machine into the hollow shank of the chisel. A passage through the centre of the chisel terminates in two holes drilled in opposite faces a short distance from its cutting edge. Immediately chipping commences, suction is created, intercepting the dust cloud and extracting it through the system, either by an eductor filter unit for a small number of machines, or by a central plant for large installations. The Dustductor grinder dust extractor system consists mainly of a combined guard and cowl which encloses a large portion of the wheel, and is provided with an outlet which is connected with a light hose leading to a filter and suction device. A fan extractor is available for the operation of a number of machines. All the equipment is being demonstrated.

Ex-Lancashire & Yorkshire Railway Officers' Association.—The third annual luncheon of the Ex.-L. & Y. R. Officers' Association will be held at the Constitutional Club, London, W.C.2, on May 28. Members of the Association, railwaymen who started on the L. & Y. R. and attained officer rank, are invited to assemble at any time during the morning. Luncheon tickets price 20s. each, are obtainable from Mr. H. E. Roberts, Honorary Secretary, 50, Ralph Court, London, W.2.

B.T.C. Stand at Mechanical Handling Exhibition.—The British Transport Commission stand at the Mechanical Handling Exhibition at Olympia, June 9-19, will feature the transport services provided by British Railways, British Road Services and the docks and inland waterways undertaking of the Commission. There will be an inquiry counter staffed by staff experienced in each form of transport, and a display of photographic enlargements showing the various forms of mechanical handling. The stand number will be Q4 on the first floor of the National Hall.

British Railways, Southern Region, Lecture & Debating Society: Continental Tour.—The Continental Tour this year of the British Railways, Southern Region, Lecture & Debating Society, will be from Friday, May 28 to Monday June 7, and will include visits to Belgium, Switzerland and Germany. The party will leave Victoria Station in the afternoon of Friday, May 28, for Brussels. A visit will be made on the Saturday morning to the Brussels Junction Railway and the new Cross City underground main line connecting the former termini at Nord and Midi. The night train will be taken to Switzerland via Strasbourg and Basel. A stay will be made at Interlaken from Sunday, May 30, to Wednesday, June 2. On Thursday, June 3, the party will travel to Coblenz. The night of Sunday, June 6, will be spent in Brussels, and the party will return to London on Whit-Monday, June 7, via Ostend and Dover.

L.M.R. Football Final.—Bescot United, the holders, have retained its British Railways, London Midland Region football challenge cup. They beat Carlisle by three goals to two on Saturday last after extra time, at Crewe.

R.E. Transportation Branch Recruiting Poster.—A colour crown folio poster has been issued by the Headquarters of the Army Emergency Reserve, Royal Engineers (Transportation & Movement Control), Longmoor, inviting enlistment in port and inland water transport units of the A.E.R. A typical port scene, with R.E. troops at work, is depicted; the colours are attractive. This poster is the forerunner of a similar poster publicising the railways side of the A.E.R.

Vickers Limited.—The Chairman of Vickers Limited, Lt.-General Sir Ronald Weeks, points out in his review of the year 1953 that the Metropolitan-Cammell Carriage & Wagon Co. Ltd. achieved a new record in deliveries from their railway rolling stock factories, largely because of the greater supplies of steel which became available. Over 70 per cent of the value of output was for export orders, including passenger coaches for South Africa, Rhodesia, Ceylon, and Egypt. Large numbers of wagons were shipped to Commonwealth countries and to Argentina. A new development was the completion for the New South Wales Government Railways of 10 diesel-electric locomotives. Over 200 standard steel coaches and 2,500 wagons were delivered to British Railways. The value of orders received during the year was appreciably lower than the total of deliveries, reflecting decreased purchasing power and intensified competition from European and other

Locomotive Named "The Gloucestershire Regiment"

(Left) Major-General C. E. A. Firth, Colonel of the Regiment, at the unveiling at Gloucester Central Station on April 24, accompanied by Sir Brian Robertson; (right) with Mr. K. W. C. Grand and Colonel J. P. Carne, V.C. (see our issue of April 30)

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

THE INDIA SUPPLY MISSION FOR INDIA invites tenders for the supply of STEEL RAILS FOR INDIAN RAILWAY. 33,600 LONG TONS, Rails—90 lb. 16,400 LONG TONS, Rails—50 lb. Forms of tender may be obtained from the Director General, India Store Department, 32/44 Edgware Road, London, W.2, on or after May 7, 1954, at a fee of 10s. which is not returnable. Cheques to be made payable to "High Commissioner for India." Tenders are to be posted direct to India Supply Mission, 2536 Massachusetts Avenue, N.W. Washington 8, D.C., to reach there by 9.15 a.m. on June 24, 1954. Please quote reference No. S.209/54.C.B./RLY.

WORKS MANAGER required for Rolling Stock Builders abroad. Previous experience in the manufacture of Steel Railway Vehicles is desirable, although not essential, but applicants should have previously held a managerial appointment. Commencing salary up to an equivalent of £188 monthly, but according to qualifications. Provident Fund, free quarters, car, medical attention and passages for family. Apply in writing only stating age and whether married and giving full details of experience and technical education, to Box 207, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

AUSTRALIA

QUEENSLAND GOVERNMENT RAILWAYS

VACANCIES—ASSISTANT CIVIL ENGINEERS.—Applications will be received by the undersigned until May 31, 1954, from persons desiring to join the service of the Commissioner for Railways, Brisbane, Queensland, Australia, in the following capacity:— ASSISTANT CIVIL ENGINEERS (4 required) —(Present salary range £963½ to £1,103 per annum— Australian currency—plus £26 per annum Instrument Allowance if appointees provide their own survey instruments—chiefly Theodolite and Level). Must hold a degree in Engineering from a recognised University or other equivalent qualifications such as A.M.I.C.E. and be capable of carrying out the usual duties of an Assistant Civil Engineer supervising (under direction) new Railway or Road Construction Jobs, and various works appertaining thereto. Must also have had at least two years experience on surveys and engineering works. Appointees will be required to serve in a District Maintenance Engineer's Office or on Railway Construction in any part of the State. The avenue of promotion would be through two grades of Assistant Engineer to Maintenance Engineer—present highest salary range £1,239 to £1,401½. Appointment may be made at a commencing salary within range stated according to qualifications and experience. Appointees will be entitled to the usual Railway Pass and Privilege Ticket Concessions applicable to employees of the Queensland Railways. Applicants should furnish details of educational standard, qualifications and experience, also submit copies of references as to character and ability and state their age and marital status. Any other particulars required and conditions of employment, will be supplied on application to the undersigned. D. J. MUIR, Agent-General for Queensland, Aust., 409-410, Strand, London.

GREAT NORTHERN RAILWAY BOARD. Tenders are invited for prototype diesel locomotives of 400 h.p., 800 h.p., and 1,000 h.p. Firms must undertake to co-operate in the construction of future locomotives of these types at the works of the G. N. R. Board in the event of their tender being accepted.

Specifications and general conditions of contract may be obtained from:

The Secretary,
Great Northern Railway Board,
Amiens Street Station,
Dublin,

on payment of a deposit of £2 2s.; which will be returned on receipt of a bona fide tender. Tenders, in sealed envelopes should reach the Secretary not later than Tuesday, June 8, 1954.

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiments. Eight single-acting cylinders with rotary valves. An application of the principles of the Willans central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. Price 2s. Post free 2s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

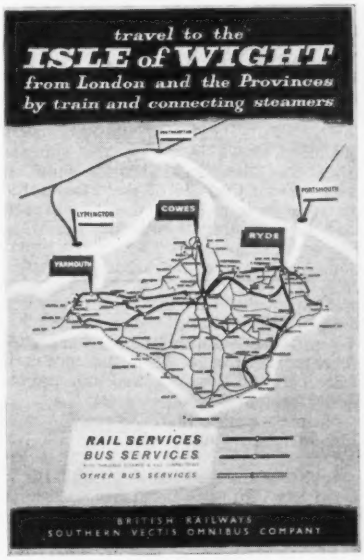
overseas manufacturers, who have been quoting low prices and early deliveries and have offered extended credits. The company's production programme for 1954 includes coaches of light alloy construction for East African Railways & Harbours, and many more passenger vehicles and freight wagons for Africa and other overseas territories. Manufacture of passenger coaches and wagons for British Railways also will continue. A final dividend of 12½ per cent, less income tax, on the ordinary stock, is recommended by the directors, making a total of 15 per cent for the year.

Marcroft Wagons Limited Results.—The trading profit of Marcroft Wagons Limited for the year 1953 was £47,220 (against £42,929 for the preceding year), and the net profit £11,782 (£10,337). An ordinary dividend is recommended of 10 per cent, and bonus 5 per cent, as last year; and £12,616 (£10,171) is to be carried forward.

Western Region Arts & Crafts Exhibition.—Examples of art and craftsmanship executed by railwaymen from all parts of the Western Region, and their families, were on show at the Town Hall, Swindon, where the British Railways, Western Region, Staff Association Exhibition of Arts & Crafts was held on May 1—6. More than 600 entries were received for the 109 different classes of the exhibition, which included paintings in oils and water colours, black and white sketches, photography, needlework, model making and other miscellaneous arts and crafts. The special awards presented by Mr. H. R. Webb, Regional Stores Superintendent, on the closing day, included the Award of Honour for the most meritorious exhibit, silver cups and trophies.

Re-siting of Station and Railway at Lochluichart.—The single-platform station at Lochluichart on the Dingwall to Skye line of the Scottish Region, with a considerable stretch of railway track, will shortly be re-sited because of development of the North of Scotland Hydro-Electric Conon Valley Scheme in the area. Under the Luichart project of the North of Scotland Hydro-Electric Scheme the waters of Loch Luichart will be raised and a portion of the existing railway track including Lochluichart Station and other buildings submerged when the waters of the Loch are impounded. The work on the deviation railway, sited at a higher level, is now almost complete. It has entailed the construction of stone pitched embankments and cutting in rock for about two miles; a new bridge over the River Conon of 100-ft. clear span; a smaller bridge of 36-ft. clear span and the building of a new station and other premises. The changeover took place on May 3. The new Lochluichart Station and the houses for the staff are built of red sandstone, are modern in every way, and include electrical equipment.

Isle of Wight Poster.—The map poster of the Isle of Wight shown in the accompanying illustration has been produced by British Railways, Southern Region, in conjunction with the Southern Vectis Omnibus Company to combat a somewhat widespread and erroneous impression that the Southern Region has entirely closed down its railway lines in the island. Printed in both double-royal and double-crown sizes, it is now being displayed throughout British Railways. It shows the rail and Southern Vectis bus services with through steamer and rail connections, also bus routes to the outlying parts, so giving prospective visitors a complete picture of public transport in the Isle of Wight.



Southern Region railway routes and steamer connections and Southern Vectis bus routes shown in Isle of Wight map poster

Potters Bar Station Reconstruction: Train Service Alterations.—In connection with the erection of new bridge spans to carry the up and down slow lines over Darkes Lane, on May 16 and 30 main-line trains and the fast outer suburban and Cambridge line trains will be diverted to the alternative route via Hertford North, while the work is in progress. On May 16 train services will be operated for local passengers between London and New Barnet and between Brookmans Park and Stevenage. Special bus services will be arranged. On May 30 train services will be operated for local passengers between London and New Barnet and between Potters Bar and Stevenage. A bus link will be provided by special buses between New Barnet, Hadley Wood and Potters Bar Stations.

Leadership in Transport.—Sir John Elliot, Chairman of London Transport, on April 27 addressed the tenth staff conference for representatives of all grades of the bus, trolleybus, coach, and station staffs at Ashridge College, on the theme of leadership. "The most important kind of leadership in London Transport," he said, "is leadership of ourselves, each of us." What the people of London thought about London Transport really meant what they thought about the man and woman they saw on the bus and on the station. The job of London Transport was always an intensely individual and personal one, he added, for it was made up of single people's daily journeys. If they gave the public courteous service, help when they needed it and a good ride, they would say that London

Transport was a well run show, and want to travel on it in their leisure hours.

Hydraulic Puller of 10,000 lb. Capacity.—A general purpose, mechanical-handling machine, known as the Brettell Hydraulic Puller & Tensioner has been manufactured by A. G. Wild & Co. Ltd., Sheffield. The apparatus takes the form of a double-acting hydraulic pump, manually-operated, in which a piston-rod is retracted into a cylinder. By this means a pull of 10,000 lb. can be exerted by the operation of an actuating lever. The design embodies a pressure relief valve. High-duty light alloy has been used in construction, and an eye for anchoring is provided. If the actuating lever is left free after use, the load is sustained. With the piston retracted, the device measures 2 ft. 6 in. overall. The machine weighs 44 lb. The appliance can be supplied with Parsons high-duty chains up to any length.

British Railways Amateur Boxing Championships.—The inter-Regional finals of the British Railways Amateur Boxing Championships were held at the Albert Hall, London, on May 4. The Scottish Region was the winner, with 24 points; and the Eastern Region second, with 21; third place was taken by the London Midland Region, which scored 15 points. The awards were presented by Sir Brian Robertson, Chairman of the British Transport Commission and President of the British Railways Amateur Boxing Association.

Demonstration of Lightweight Diesel Train.—The four-coach diesel train for the West Riding local services, comprised of two two-coach units as described in the article on another page, was inspected at Marylebone Station on April 29 by Members and senior officers of the British Transport Commission and its transport undertakings, and their guests who included principals and representatives of firms which supplied the equipment. A demonstration trip was made to Beaconsfield and back, with stops on the outward journey at Sudbury Hill, to demonstrate station stop on sharp curve, and at Denham, to show restart on rising gradient. The schedules, which allowed for permanent and temporary speed restrictions, were easily maintained. Those who travelled on the demonstration run included:—

Messrs. H. P. Barker, D. S. M. Barrie, Sir John Benstead, Sir Ian Bolton, Messrs. R. C. Bond, J. H. Brebner, George Dow,

Sir John Elliot, Messrs. J. F. Harrison, R. F. Harvey, C. P. Hopkins, S. E. Parkhouse, F. A. Pope, E. W. Rostern,

Messrs. H. A. Short, S. W. Smart, J. C. L. Train, E. D. Trask, J. W. Watkins, A. J. White, Lt.-Colonel G. R. S. Wilson, Sir Reginald Wilson.

Forthcoming Meetings

May 8 (*Sat.*).—Permanent Way Institution. Visit to Toton Marshalling Yards, London Midland Region.

May 10 (*Mon.*).—Historical Model Railway Society, at the headquarters of the Stephenson Locomotive Society, 32, Russell Road, London, W.14, at 7 p.m. Talk entitled "Railway photographs from my collection," by Mr. George Dow.

May 11 (*Tue.*).—Institution of Civil Engineers, at Great George Street, Westminster, S.W.1, at 5.30 p.m. Paper on "Wear of steel rails; a review of the factors involved," by Mr. J. Dearden.

May 11 (*Tue.*).—Road Haulage Association, at Grosvenor House, Park Lane, W.1, at 12.30 for 1 p.m. Annual luncheon. Principal guests: Mr. Alan Lennox-Boyd and Lord Brabazon.

May 12 (*Wed.*).—Newcomen Society, in the Science Museum, Exhibition Road, South Kensington, S.W.7, at 6 p.m. First Dickinson Lecture entitled "The new era in the history of technology," by Dr. Charles Singer.

May 13 (*Thu.*) to May 14 (*Fri.*).—Institution of Locomotive Engineers, summer meeting at Crewe, Chester and Shotton.

May 15 (*Sat.*).—Permanent Way Institution. Visit to Toton Marshalling Yards, London Midland Region.

May 18 (*Tue.*) to May 20 (*Thu.*).—Public Transport Association Conference at Blackpool.

May 22 (*Sat.*).—Permanent Way Institution, Leeds & Bradford Section, at 2.30 p.m. Afternoon visit to the North Eastern Gas Board, West Yorkshire Gas Grid, Teagley, near Wakefield.

May 26 (*Wed.*) to May 29 (*Sat.*).—British Railways & London Transport Exhibition of latest developments of railway locomotives, rolling stock, and engineering equipment at Willesden Motive Power Depot. Wednesday 3 to 7 p.m. Thursday to Saturday inclusive, 10 a.m. to 7 p.m.

May 26 (*Wed.*).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, London, W.C.2, at 6.15 p.m. Annual general meeting.

May 28 (*Fri.*). to May 30 (*Sun.*).—Institution of Railway Signal Engineers'. Summer meeting at Utrecht, by invitation of the General Manager, Netherlands Railways.

May 29 (*Sat.*).—Royal Engineers' Association, London Group. Second London sapper reunion, at the Duke of York's Headquarters, Chelsea, S.W.3, from 7 to 11 p.m.

Railway Stock Market

More buoyant and active conditions have featured stock markets under the lead of a strong advance in British Funds. The exceptionally good increase in British gold and dollar reserves last month and the strength of sterling had a strong influence on sentiment. The trade recession in the U.S.A. is not affecting British export trade unduly. On the contrary, world demand for sterling is larger than for a long time and foreign capital is coming to London at such a rate that there is talk that our money rates may have to be reduced. This explains the revived talk of a reduction in the bank rate from 3½ to 3 per cent. The possibility of a lower bank rate has been an important factor in the strength of British Funds and also partly explains the rally in leading industrial shares, which usually tend to be influenced by the trend in the gilt-edged market. The increased dividends and share bonus news which continues to feature company results also helped sentiment. It is realised, however, that in the very near future markets generally will be influenced in the main by international developments.

There was not much business passing in foreign rails. Manila Railway stocks quietened down, awaiting the statement from the directors indicating how the money from the sale of the Manila Railroad bonds is to be used. It is expected that the decision will be to put the Manila Railway Company into voluntary liquidation. Meanwhile the directors may be able to give a provisional estimate of the breakup value of the debentures and shares. The "A" debentures have changed hands around 141, the "B" debentures around 133, the preference shares around 18s. 6d. and the ordinary shares around 8s. 6d.

Nitrate Rails shares firmed up to 20s. 9d. San Paulo units were 3s. "ex" the capital repayment, while Taltal Railway shares changed hands around 14s. 6d.

Dorada Railway ordinary stock remained active, but at 75½ lost part of their recent rise, though buyers were still coming in, because in the event of a takeover of the railway in the future, the ordinary stock would, it seems, be worth well over its current market price. Dorada 6 per cent debentures were again quoted at 90.

Guayaquil & Quito 5 per cent first bonds changed hands at 51½. Business in International of Central America common shares was recorded at $10, the first dealing marked since January.

Antofagasta ordinary and preference stocks were 8¼ and 40 respectively. The 4 per cent debentures were 44 and the 5 per cent (Bolivia) debentures 67½. United of Havana second income stock was 43 and the consolidated stock 6¾. Elsewhere, Paraguay Central 6 per cent debentures were 19½, while Costa Rica ordinary stock was 9, and the 6½ per cent first debentures 62.

In Indian stocks, Barsi were again quoted at 126. Emu Bay 4½ per cent debentures have changed hands at 63. Midland of Western Australia ordinary was 22 with the income debenture stock 42½.

The Nyasaland Railways 3½ per cent debentures were 79½. Canadian Pacifics were $43¾ and White Pass $24¼.

Among road transport shares, West Riding were 34s. 9d., Southdown 32s., and Lancashire Transport 47s. 6d. B.E.T. "A" 5s. deferred units strengthened to 44s. 7½d. after being down to 44s. 3d.

Shares of locomotive builders and engineers remained more active on further consideration of the important financial results issued in the past few weeks. Beyer Peacock rose to 37s. 3d. on the Chairman's annual statement and the belief that when more capital is required it is likely to be raised by an offer to shareholders on favourable terms. Charles Roberts 5s. shares were 8s. 7½d., while Hurst Nelson were 42s. at Glasgow and Birmingham Carriage 26s. 9d. at Birmingham.

North British Locomotive changed hands around 15s. 9d., Vulcan Foundry were 24s., Gloucester Wagon 10s. shares 17s., and Wagon Repairs 5s. shares 12s. 9d.

Engineering shares generally have been more active, with Guest Keen rallying to 59s. 1½d. Vickers became firmer at 56s. 6d. on further consideration of the full results and Chairman's annual review, but Babcock & Wilcox have reacted sharply to 52s. following the 12 per cent dividend which was below best market estimates. Ruston & Hornsby were 49s. 6d., Tube Investments 64s., T. W. Ward 95s. and United Steel 24s. 6d.